



STIC Search Report

EIC 1700

STIC Database Tracking Number: 193495

TO: James Lin
Location: Rem 8A28
Art Unit : 1762
June 22, 2006

Case Serial Number: 10/630887

From: Kathleen Fuller
Location: EIC 1700
REMSEN 4B28
Phone: 571/272-2505
Kathleen.Fuller@uspto.gov

Search Notes

If you have any questions please give me a call or come and see me.



STIC Search Results Feedback Form

EIC17000

Questions about the scope or the results of the search? Contact the EIC searcher or contact:

Kathleen Fuller, EIC 1700 Team Leader
571/272-2505 REMSEN 4B28

Voluntary Results Feedback Form

- I am an examiner in Workgroup: Example: 1713
- Relevant prior art found, search results used as follows.

- ☐ 102 rejection
- ☐ 103 rejection
- ☐ Cited as being of interest.
- ☐ Helped examiner better understand the invention.
- ☐ Helped examiner better understand the state of the art in their technology.

Types of relevant prior art found:

- ☐ Foreign Patent(s)
- ☐ Non-Patent Literature
(journal articles, conference proceedings, new product announcements etc.)

➤ Relevant prior art not found:

- ☐ Results verified the lack of relevant prior art (helped determine patentability).
- ☐ Results were not useful in determining patentability or understanding the invention

Comments:

Anekwe, Imelda (ASRC)

193495

From: JAMES LIN [james.lin@uspto.gov]
Sent: Tuesday, June 20, 2006 1:35 PM
To: STIC-EIC1700
Subject: Database Search Request, Serial Number: 10630887

Requester:
JAMES LIN (P/1762)
Art Unit:
GROUP ART UNIT 1762
Employee Number:
82271
Office Location:
REM 08A28
Phone Number:
(571)272-8902
Mailbox Number:

SCIENTIFIC REFERENCE BR
Sci & Tech Inf. Cntr.

JUN 21 REC

Pat. & T.M. Office

Case serial number:
10630887
Class / Subclass(es):
427/100
Earliest Priority Filing Date:
8/2/02
Format preferred for results:
Paper
Search Topic Information:

The method:

Forming a piezoelectric layer between two electrodes, wherein the piezoelectric layer protudes beyond the electrodes;

depositing a coating liquid in the gap between the protuding piezoelectric layer and the substrate;

the coating liquid is a polymerizable oligomer and inorganic particles in a dispersion medium.

Examples in the spec:

polymerizable oligomer - vinyl polyer (i.e., acryl resin), epoxy resin, polyurethane, polyester, polycarbonate, and polysiloxane polymer

inorganic particles - Ti, Zr, V, Nb, Cr, Mo, W, Al, Mn, Fe, Co, Ni, and Si

dispersion medium - water, methanol, ethanol, propanol, isopropyl alcohol, butanol, and acetone

Method integrated with apparatus:
see claims 2-6

Special Instructions and Other Comments:
5/4/9 schedule with 2nd Monday off
7:30 AM - 5 PM

=> file wpiX

FILE 'WPIX' ENTERED AT 15:36:19 ON 22 JUN 2006

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FILE LAST UPDATED: 20 JUN 2006 <20060620/UP>
MOST RECENT DERWENT UPDATE: 200639 <200639/DW>
DERWENT WORLD PATENTS INDEX SUBSCRIBER FILE, COVERS 1963 TO DATE

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<http://scientific.thomson.com/media/scpdf/ipcrdmpi.pdf> <<<

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INDEX ENHANCEMENTS PLEASE VISIT:
<http://www.scientific.thomson.com/cm/dwpienhancements> <<<

=> d que 125

L1 1960 SEA FILE=HCAPLUS ABB=ON PIEZOELECTR?(3A) (LAYER? OR INTERLAYER?
)
L2 71 SEA FILE=HCAPLUS ABB=ON L1 AND ELECTROSTRICT?
L3 98700 SEA FILE=HCAPLUS ABB=ON ELECTRODE?(3A) (TOP OR BOTTOM OR UPPER
OR LOWER OR BETWEEN OR TWO OR 2 OR STACK? OR BEYOND)
L4 21 SEA FILE=HCAPLUS ABB=ON L2 AND L3
L5 2 SEA FILE=HCAPLUS ABB=ON L4 AND (GAP OR PROJECT?)
L6 4 SEA FILE=HCAPLUS ABB=ON L4 AND COAT?
L7 11 SEA FILE=HCAPLUS ABB=ON L4 AND SUBSTRAT?
L8 2 SEA FILE=HCAPLUS ABB=ON L4 AND (POLYMER? OR OLIGOMER? OR
VINYL? OR EPOX? OR POLYURETHANE? OR POLYESTER? OR POLYCARBONATE
? OR POLYSILOXANE? OR SILOXANE? OR URETHANE?)
L9 375 SEA FILE=HCAPLUS ABB=ON L1 AND L3
L10 26 SEA FILE=HCAPLUS ABB=ON L9 AND (POLYMER? OR OLIGOMER? OR
VINYL? OR EPOX? OR POLYURETHANE? OR POLYESTER? OR POLYCARBONATE
? OR POLYSILOXANE? OR SILOXANE? OR URETHANE?)
L11 8 SEA FILE=HCAPLUS ABB=ON L10 AND SUBSTRAT?
L12 34 SEA FILE=HCAPLUS ABB=ON L9 AND COAT?
L13 3 SEA FILE=HCAPLUS ABB=ON L12 AND (GAP OR PROJECT?)
L14 16 SEA FILE=HCAPLUS ABB=ON L12 AND SUBSTRAT?
L18 79 SEA FILE=WPIX ABB=ON (L5 OR L6 OR L7 OR L8) OR L11 OR L13 OR
L14
L19 2 SEA FILE=WPIX ABB=ON L18 AND B05D?/IC
L20 54 SEA FILE=WPIX ABB=ON L18 AND H01L?/IC
L22 5 SEA FILE=WPIX ABB=ON L20 AND SUBSTRAT?(4A) COAT?
L23 7 SEA FILE=WPIX ABB=ON L19 OR L22
L24 7 SEA FILE=WPIX ABB=ON L18 AND SUBSTRAT?(4A) COAT?
L25 8 SEA FILE=WPIX ABB=ON L23 OR L24

=> d 125 full 1-8

L25 ANSWER 1 OF 8 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN
AN 2005-649355 [66] WPIX
DNN N2005-531952 DNC C2005-195561
TI Piezoelectric thin film used in piezoelectric element for ink jet system

recording head, of perovskite crystals, with surface including crystal grains.

DC L03 P75 T04 U11 U12 V06

IN ERITATE, S; KOBAYASHI, M; KUBOTA, M; MAEDA, K; SHIMIZU, C; UCHIDA, F

PA (CANO) CANON KK; (FUJC) FUJI KAGAKU KK; (FUJC) FUJI CHEM CO LTD

CYC 109

PI WO 2005083809 A1 20050909 (200566)* EN 61 H01L041-09 <--

RW: AT BE BG BW CH CY CZ DE DK EA EE ES FI FR GB GH GM GR HU IE IS IT
KE LS LT LU MC MW MZ NA NL OA PL PT RO SD SE SI SK SL SZ TR TZ UG
ZM ZW

W: AE AG AL AM AT AU AZ BA BB BG BR BW BY BZ CA CH CN CO CR CU CZ DE
DK DM DZ EC EE EG ES FI GB GD GE GH GM HR HU ID IL IN IS KE KG KP
KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NA NI NO NZ OM
PG PH PL PT RO RU SC SD SE SG SK SL SM SY TJ TM TN TR TT TZ UA UG
US UZ VC VN YU ZA ZM ZW

JP 2005272294 A 20051006 (200566) 19 C04B035-49

ADT WO 2005083809 A1 WO 2005-JP3435 20050223; JP 2005272294 A JP 2005-33223
20050209

PRAI JP 2004-55479 20040227

IC ICM C04B035-49; H01L041-09

ICS B41J002-045; B41J002-055; B41J002-16; C01G025-00; C30B029-32;

H01L041-187; H01L041-22; H01L041-24;

H02N002-00

AB WO2005083809 A UPAB: 20051014

NOVELTY - A piezoelectric thin film (3) is of perovskite crystals with surface including crystal grains having equivalent circle diameter of at least 200 nm and those having the equivalent circle diameter of at most 40 nm. The film thickness of the piezoelectric thin film is 1,000-4,000 nm.

DETAILED DESCRIPTION - The piezoelectric thin film of perovskite crystals is a compound of formula $Pb(1-x)Lax(ZryTil-y)O3$, with surface including crystal grains having equivalent circle diameter of at least 200 nm, and those having the equivalent circle diameter of at most 40 nm. The film thickness of the piezoelectric thin film is 1,000-4,000 nm. The number of crystal grains observed in the surface of the thin film and having the equivalent circle diameter of at most 40 nm is 5% with respect to the total number of crystal grains observed in the surface of the thin film. It is provided that 0 at most x at most 1, and 0.05 at most y at most 1. An INDEPENDENT CLAIM is also included for a method of manufacturing piezoelectric thin film comprising applying raw material solution containing titanium, zirconium, and lead on substrate to form a coating layer; and firing the coating layer at 400-700 deg. C to form piezoelectric layer having layer thickness of 150-400 nm every time the coating layer is formed to form the thin film.

USE - Used in piezoelectric element and piezoelectric actuator for ink jet system recording head (claimed).

ADVANTAGE - The invention provides piezoelectric thin film whose uniformity of a composition is high and whose crystal system is the same and which holds a satisfactory piezoelectric characteristics.

DESCRIPTION OF DRAWING(S) - The figure is a longitudinal section showing the piezoelectric element.

Substrate 1

Lower electrode 2

Piezoelectric thin film 3

Upper electrode 4

Arbitrary regions 5, 6

Dwg.1/10

TECH WO 2005083809 A1UPTX: 20051014

TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Properties: The crystal grains observed in the surface of the piezoelectric thin film and having

the equivalent circle diameter of greater than or equal to 200 nm are columnar crystals grown from a **substrate**. A peak value of an equivalent circle diameter distribution of the crystal grains observed in the surface of the piezoelectric thin film is 50-200 nm.

TECHNOLOGY FOCUS - ORGANIC CHEMISTRY - Preferred Properties: The crystal grains observed in the surface of the piezoelectric thin film and having the equivalent circle diameter of greater than or equal to 200 nm are columnar crystals grown from a **substrate**. A peak value of an equivalent circle diameter distribution of the crystal grains observed in the surface of the piezoelectric thin film is 50-200 nm.

TECHNOLOGY FOCUS - ORGANIC CHEMISTRY - Preferred Compounds: The raw material solution contains 11,8-diazabicyclo(5.4.0)-7-undecene; 1,5-diazabicyclo(4.3.0)non-5-en; or 1,4-diazabicyclo(2.2.2)octane as stabilizer.

FS CPI EPI GMPI

FA AB; GI

MC CPI: L03-G09A; L03-G10A1

EPI: T04-G02A1; U11-A02; U12-B03E; V06-M06D; V06-M11

L25 ANSWER 2 OF 8 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN

AN 2005-225821 [24] WPIX

CR 2004-135174 [14]

DNN N2006-315456 DNC C2006-120600

TI Piezoelectric/electrostriction film type component has electrodes, **substrate**, **piezoelectric/electrostriction layer** having protrusion portion joined with **substrate** by material containing inorganic particle scattered in **polymer matrix**.

DC A85 L03 U12 V06

PA (NIGA) NGK INSULATORS LTD

CYC 1

PI JP 2005050830 A 20050224 (200524)* 24 H01L041-09 <--

ADT JP 2005050830 A JP 2003-193850 20030708

PRAI JP 2003-160430 20030605; US 2002-395503P 20020712

IC ICM H01L041-09

ICS H01L041-083; H01L041-18; H01L041-187;
H01L041-22; H02N002-00

AB JP2005050830 A UPAB: 20060620

NOVELTY - A piezoelectric/electrostriction film type component (10) has **lower electrode** (77), **piezoelectric/electrostriction layer** (73), **upper electrode** (75) and ceramic **substrate** (44), in preset arrangement. The protrusion portion (79) of the **piezoelectric/electrostriction layer** is joined with the **substrate** by specific joining material (70).

DETAILED DESCRIPTION - The piezoelectric/electrostriction film type component has **lower electrode**, **piezoelectric/electrostriction layer** and **upper electrode** sequentially laminated on a ceramic **substrate**. The **piezoelectric/electrostriction layer** is equipped with **piezoelectric/electrostriction functional portion** (78) covering the upper surface and lower surface of **lower electrode** and **upper electrode**, respectively. The layer protrudes and is provided in the edge portion. The protrusion portion of the **piezoelectric/electrostriction layer** is joined with the **substrate** by hybrid material containing inorganic particle scattered in matrix of **polymer compound**. An INDEPENDENT

CLAIM is included for manufacture of piezoelectric/
electrostriction film type component, which involves sequentially
laminating lower electrode piezoelectric/
electrostriction layer and upper
electrode on ceramic substrate, applying coating
liquid containing polymerizable oligomer and/or
polymerizable monomer of inorganic particle and dispersion medium
between protrusion portion of the piezoelectric/
electrostriction layer and substrate and
drying the coating liquid to form joining material for joining
the protrusion portion of the layer with the substrate.

USE - As piezoelectric/electrostriction film type element.

ADVANTAGE - The piezoelectric/electrostriction film type
element has excellent durability, rapid responding property and high
resonance frequency.

DESCRIPTION OF DRAWING(S) - The figure shows the partial
cross-sectional view of the piezoelectric/electrostriction film
type element.

piezoelectric/electrostriction film type element 10
substrate 44
joining material 70
piezoelectric/electrostriction layer 73
upper electrode 75
lower electrode 77
piezoelectric/electrostriction functional portion 78
protrusion portion 79

Dwg.1/19

TECH JP 2005050830 AUPTX: 20050422

TECHNOLOGY FOCUS - ELECTRONICS - Preferred Element: The piezoelectric/
electrostriction film type element has several electrodes and
several piezoelectric/electrostriction layers
alternately laminated on ceramic substrate. The multilayered
structure of the electrode is arranged between
lower and upper piezoelectric/electrostriction
layers.

TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Properties: The average
particle diameter of the inorganic particle is 5 nm-1 μ m. The inorganic
particle has bimodal particle size distribution. The ratio of average
particle diameter of large inorganic particle of particle size greater
than the particle size corresponding to the point of inflexion existing
between 2 points, and average particle diameter of small inorganic
particle of particle size lesser than the particle size corresponding to
the point of inflexion is 0.05-0.7. Preferred Liquid: The coating
liquid contains siloxane oligomer and silica particle
mixed with polar dispersion medium. Preferred Oligomer: The
siloxane oligomer is polymerizable monomer or
polymerizable oligomer of formula: $R_nSi(OR')_{4-n}$, where R
is same as defined above, R' is methyl, ethyl, propyl, butyl,
(beta)-methoxy ethoxy group, aryl, acetyl and/or substituted alkyl group,
and n is 0-3. Preferred Method: The coating liquid is applied by
spin coat method at a rotational speed of 1500 rpm or more.

TECHNOLOGY FOCUS - ORGANIC CHEMISTRY - Preferred Properties: The average
particle diameter of the inorganic particle is 5 nm-1 μ m. The inorganic
particle has bimodal particle size distribution. The ratio of average
particle diameter of large inorganic particle of particle size greater
than the particle size corresponding to the point of inflexion existing
between 2 points, and average particle diameter of small inorganic
particle of particle size lesser than the particle size corresponding to
the point of inflexion is 0.05-0.7. Preferred Liquid: The coating

liquid contains **siloxane oligomer** and silica particle mixed with polar dispersion medium. Preferred Oligomer: The **siloxane oligomer** is **polymerizable monomer** or **polymerizable oligomer** of formula: $R_nSi(OR')_{4-n}$, where R is same as defined above, R' is methyl, ethyl, propyl, butyl, (beta)-methoxy ethoxy group, aryl, acetyl and/or substituted alkyl group, and n is 0-3. Preferred Method: The coating liquid is applied by spin coat method at a rotational speed of 1500 rpm or more.

TECHNOLOGY FOCUS - **POLYMERS** - Preferred Material: The hybrid material contains **polysiloxane polymer** as main component. Preferred Polymer: The **polysiloxane polymer** is a **polymer** having substituent of formula (1). (MK1) R=methyl, ethyl, and/or propyl, or aryl, alkenyl, (gamma)-methacryloxy propyl, (gamma)-glycidoxo propyl, (gamma)-chloropropyl, (gamma)-mercapto propyl, (gamma)-aminopropyl and/or trifluoromethyl group.

FS CPI EPI
FA AB; GI
MC CPI: L03-G10A
EPI: U12-B03E; V06-L01A; V06-L02

L25 ANSWER 3 OF 8 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN

AN 2004-746114 [73] WPIX

CR 2003-657526 [62]

DNN N2004-589332 DNC C2004-262183

TI Manufacture of liquid jetting head, e.g. inkjet recording head, by bonding two **substrates** with adhesive agent while forming **coating** layer comprised of resin material, and forming communicating portion.

DC L03 P75 T04 V06

IN KAMEI, H; MURAI, M

PA (SHIH) SEIKO EPSON CORP

CYC 1

PI US 2004196336 A1 20041007 (200473)* 17 B41J002-045

US 6813831 B2 20041109 (200474) B21D053-76

ADT US 2004196336 A1 Div ex US 2002-242665 20020913, US 2004-827470 20040420;

US 6813831 B2 Div ex US 2002-242665 20020913, US 2004-827470 20040420

FDT US 2004196336 A1 Div ex US 6758554; US 6813831 B2 Div ex US 6758554

PRAI JP 2001-278115 20010913

IC ICM B21D053-76; B41J002-045

ICS H04R017-00

AB US2004196336 A UPAB: 20041117

NOVELTY - A liquid jetting head is manufactured by providing a first **substrate** (10) including a vibration plate and formed with a first through hole, forming piezoelectric elements (300) comprised of **upper and lower electrodes** (80, 60), providing a second **substrate** (30) having second through hole, bonding the second and first **substrates** with an adhesive agent (25) while forming a **coating** layer (121) comprised of a resin material, and forming a communicating portion.

DETAILED DESCRIPTION - Manufacture of a liquid jetting head comprises:

(1) providing a first **substrate**, which defines pressure generating chambers (12), the first **substrate** including a vibration plate which forms a first surface of the first **substrate**, and formed with a first through hole;

(2) forming piezoelectric elements on the vibration plate to associate with one of the pressure generating chambers, each piezoelectric element comprised of an **upper electrode**, a **lower electrode** and a **piezoelectric**

layer provided between the upper and lower electrodes;

(3) providing a second substrate formed with a second through hole;

(4) bonding the second substrate on the first surface of the first substrate with an adhesive agent, while forming a coating layer comprised of a resin material on an inner wall face of a region at which the first through hole and the second through hole are to be connected; and

(5) forming a communicating portion at which the first through hole and the second through hole are connected.

USE - The invention is used for the manufacture of liquid jetting head, e.g. inkjet recording head.

ADVANTAGE - The invention stabilizes ink-ejecting property to improve reliability.

DESCRIPTION OF DRAWING(S) - The figure shows an enlarged sectional view of the inkjet recording head.

First substrate 10

Pressure generating chambers 12

Nozzle plate 20

Adhesive agent 25

Second substrate 30

Upper and lower electrodes 80, 60

Coating layer 121

Piezoelectric elements 300

Dwg.3/9

TECH US 2004196336 A1UPTX: 20041112

TECHNOLOGY FOCUS - IMAGING AND COMMUNICATION - Preferred Method: The adhesive agent is extended to protrude from the inner wall face to form the coating layer. The communicating portion is formed by a mechanical processing, or by a laser processing. A nozzle plate (20) is bonded on a second surface of the first substrate opposing to the first surface, the nozzle plate formed with a plurality of nozzle orifices each communicated with one of the pressure generating chambers. The steps are performed with respect to a wafer in which first substrates are integrally formed.

FS CPI EPI GMPI

FA AB; GI

MC CPI: L03-D04G

EPI: T04-G02; V06-M06D; V06-M11; V06-U04B

L25 ANSWER 4 OF 8 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN

AN 2004-237054 [22] WPIX

DNN N2004-187828

TI Piezoelectric and electrostrictive film type device manufacturing method, involves forming piezoelectric/electrostrictive layer beyond electrodes to form projected portions at ends of piezoelectric/electrostrictive layer.

DC P42 P75 V06 V07

IN BESSHO, Y; MURASATO, M; OHNISHI, T; TAKAHASHI, N

PA (NIGA) NGK INSULATORS LTD

CYC 105

PI US 2004022935 A1 20040205 (200422)* 26 B05D005-12 <--

WO 2004013918 A1 20040212 (200422) JA H01L041-09

RW: AT BE BG CH CY CZ DE DK EA EE ES FI FR GB GH GM GR HU IE IT KE LS
LU MC MW MZ NL OA PT RO SD SE SI SK SL SZ TR TZ UG ZM ZW

W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK
DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR
KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NI NO NZ OM PG PH

PL PT RO RU SC SD SE SG SK SL SY TJ TM TN TR TT TZ UA UG UZ VC VN
YU ZA ZM ZW

AU 2003252300 A1 20040223 (200453) H01L041-09
ADT US 2004022935 A1 Provisional US 2002-400513P 20020802, US 2003-630887
20030730; WO 2004013918 A1 WO 2003-JP9609 20030729; AU 2003252300 A1 AU
2003-252300 20030729

FDT AU 2003252300 A1 Based on WO 2004013918

PRAI US 2002-400513P 20020802; US 2003-630887 20030730

IC ICM B05D005-12; H01L041-09

ICS B05D003-02; B41J002-045; G21H001-00; H01L041-22

AB US2004022935 A UPAB: 20040331

NOVELTY - The method involves forming a **piezoelectric/
electrostrictive layer beyond
electrodes** (75,77) to form **projected** portions at its
end, and **coating** a liquid prepared by admixing a
polymerizable oligomer and inorganic particles in a
dispersing medium. The **coating** liquid is dried to form a
coupling unit to couple ends of a **projected** portion of the
piezoelectric/electrostrictive layer to a
substrate (44).

USE - Used for manufacturing a piezoelectric and
electrostrictive film type device.

ADVANTAGE - The piezoelectric and **electrostrictive** film
type device manufacturing method facilitates to manufacture a piezoelectric
and **electrostrictive** film type device having a high resonance
frequency and increased efficiency, and efficiently facilitates to secure
the conduction of each electrode.

DESCRIPTION OF DRAWING(S) - The drawing shows a partial sectional
view of a piezoelectric and **electrostrictive** film type device.

Substrate 44

Thin portion 66

Fixing portion 68

Electrodes 75,77

Piezoelectric/ electrostrictive operation portion 78

Dwg.6/15

FS EPI GMPI

FA AB; GI

MC EPI: V06-E02; V06-J01; V07-K01B; V07-K05

L25 ANSWER 5 OF 8 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN

AN 2004-135174 [14] WPIX

CR 2005-225821 [24]

DNN N2004-107860 DNC C2004-053942

TI Piezoelectric/**electrostrictive** film device comprises

projecting portion of **piezoelectric/
electrostrictive layer** coupled to **substrate** by
coupling component consisting of specific hybrid material.

DC A26 A85 L03 V06

IN BESSHO, Y; KOBAYASHI, N; MURASATO, M; TAKAHASHI, N /

PA (NIGA) NGK INSULATORS LTD

CYC 32

PI EP 1381093 A2 20040114 (200414)* EN 32 H01L041-09 <--

R: AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LT LU LV

MC MK NL PT RO SE SI SK TR

US 2004007947 A1 20040115 (200414) H02N002-00

ADT EP 1381093 A2 EP 2003-254404 20030711; US 2004007947 A1 Provisional US
2002-395503P 20020712, US 2003-615545 20030708

PRAI US 2002-395503P 20020712; US 2003-615545 20030708

IC ICM H01L041-09; H02N002-00

ICS H01L041-04; H01L041-22

AB EP 1381093 A UPAB: 20050414

NOVELTY - A piezoelectric/electrostrictive film device comprises a projecting portion of a piezoelectric/electrostrictive layer being a coupling component constituted of a hybrid material in which inorganic particles are scattered in a matrix of a polymer compound. The projecting portion is coupled to a substrate.

DETAILED DESCRIPTION - A piezoelectric/electrostrictive film device comprises a substrate (44) formed of ceramic; and a piezoelectric/electrostrictive operation portion (78) including a lower electrode (77), piezoelectric/electrostrictive layer (73) and upper electrode (75) which are successively stacked on the substrate and including a projecting end of the piezoelectric/electrostrictive layer with which an upper surface of the lower electrode and a lower surface of the upper electrode are coated. A projecting portion (79) of the piezoelectric/electrostrictive layer is a coupling component (70) comprising a hybrid material in which inorganic particles are scattered in a matrix of a polymer compound and is coupled to the substrate.

An INDEPENDENT CLAIM is also included for a manufacturing method of a piezoelectric/electrostrictive film device comprising coating an upper surface of the lower electrode and a lower surface of the upper electrode with the piezoelectric/electrostrictive layer; projecting an end of the piezoelectric/electrostrictive layer; applying a coating liquid obtained by mixing a polymerizable oligomer and/or a polymerizable monomer and inorganic particles in a dispersing medium between at least the projecting portion of the piezoelectric/electrostrictive layer and the substrate; drying the coating liquid to form a coupling component; and coupling the projecting portion of the piezoelectric/electrostrictive layer to the substrate by the coupling component.

USE - As a piezoelectric/electrostrictive film device.

ADVANTAGE - When a projecting portion of a piezoelectric/electrostrictive layer is coupled to a substrate by a coupling component constituted of a specific hybrid material, the piezoelectric/electrostrictive film device having a large resonance frequency is obtained without generating any crack in the coupling component or the piezoelectric/electrostrictive layer. The piezoelectric/electrostrictive film device of the invention has no drop in the flexural displacement. It has good durability against repeated high-speed driving.

DESCRIPTION OF DRAWING(S) - The figure shows a partial sectional view of a piezoelectric/electrostrictive film device of the invention.

Substrate 44

Cavity 48

Thin portion 66

Coupling component 70

Piezoelectric/electrostrictive layer 73

Upper electrode 75

Lower electrode 77

Piezoelectric/electrostrictive operation portion 78

Projecting portion 79

Dwg.1/19

TECH EP 1381093 A2 UPTX: 20040226

TECHNOLOGY FOCUS - **POLYMERS** - Preferred Materials: The coupling component comprises the hybrid material in which silica particles are scattered in the matrix containing a **polysiloxane polymer** as a main component. The **polysiloxane polymer** is a **polysiloxane polymer** in which a substituent group is introduced in a part shown in the formula (1).
R = alkyl including methyl, ethyl, propyl, aryl, and/or alkenyl; or substituent alkyl including alpha-methacryloxypropyl, gamma-glycidoxypropyl, gamma-chloropropyl, gamma-mercaptopropyl, gamma-aminopropyl, and/or trifluoromethyl.

TECHNOLOGY FOCUS - **INORGANIC CHEMISTRY** - Preferred Properties: An average particle diameter of the inorganic particles is 5 nm to 1 μm. The inorganic particles have a two-peak particle size distribution. A ratio (D/C) of an average particle diameter (C) of large-diameter inorganic particles having a particle diameter larger than that corresponding to an inflection point existing between two peaks to an average particle diameter (D) of small-diameter inorganic particles having a particle diameter not more than that corresponding to the inflection point is 0.05-0.7.

TECHNOLOGY FOCUS - **MECHANICAL ENGINEERING** - Preferred Method: Applying the coating liquid is performed by a spin coating method at at least 1500 rpm.

FS CPI EPI
FA AB; GI
MC CPI: A11-B05; A12-E15; L03-D01B
EPI: V06-L01A; V06-L02; V06-M06D; V06-M11

L25 ANSWER 6 OF 8 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN

AN 2004-062038 [06] WPIX

DNN N2004-050266 DNC C2004-025353

TI Deposition of dense, thick piezoelectric composite coatings with uniform microstructure on electrode layer coated silicon substrate, comprises preparing organo-metallic sol-gel solution of lead zirconate titanate.

DC A85 L03 V01 V06

IN TAN, O K; WANG, Z; ZHAO, C; ZHU, W; CHANGLEI, Z; KIANG, T O; WEIGUANG, Z; ZHIHONG, W

PA (ACOU-N) ACOUSTICAL TECHNOLOGIES SINGAPORE PTE LT; (NTUV-N) NTU VENTURES PTE LTD; (TANO-I) TAN O K; (WANG-I) WANG Z; (ZHAO-I) ZHAO C; (ZHUW-I) ZHU W

CYC 103

PI WO 2003099741 A1 20031204 (200406)* EN 35 C04B035-624
RW: AT BE BG CH CY CZ DE DK EA EE ES FI FR GB GH GM GR HU IE IT KE LS
LU MC MW MZ NL OA PT RO SD SE SI SK SL SZ TR TZ UG ZM ZW
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK
DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR
KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NI NO NZ OM PH PL
PT RO RU SC SD SE SK SL TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA
ZM ZW

AU 2003237766 A1 20031212 (200443) C04B035-624

SG 107103 A1 20041129 (200501) C04B035-624

AU 2003237766 A8 20031212 (200559) C04B035-624

US 2005255239 A1 20051117 (200576) B05D003-00 <--

ADT WO 2003099741 A1 WO 2003-SG116 20030516; AU 2003237766 A1 AU 2003-237766 20030516; SG 107103 A1 SG 2002-3154 20020524; AU 2003237766 A8 AU 2003-237766 20030516; US 2005255239 A1 WO 2003-SG116 20030516, US

2005-516059 20050531

FDT AU 2003237766 A1 Based on WO 2003099741; AU 2003237766 A8 Based on WO 2003099741

PRAI SG 2002-3154 20020524

IC ICM B05D003-00; C04B035-624

ICS B05D005-12; C04B035-01; C04B035-26; C04B035-468;
C04B035-48; C04B035-491

AB WO2003099741 A UPAB: 20040123

NOVELTY - Dense, thick piezoelectric composite **coatings** with uniform microstructure are deposited on an electrode layer **coated** silicon **substrate** by preparing organo-metallic sol-gel solution of lead zirconate titanate with selected concentration and chemical formula.

DETAILED DESCRIPTION - Deposition of dense, thick piezoelectric composite **coatings** with uniform microstructure on an electrode layer **coated** silicon **substrate** comprises preparing organo-metallic sol-gel solution of lead zirconate titanate $Pb_{1+y}(Zr_xTi_{1-x})O_3$ (PZT) with selected concentration and chemical formula; dispersing selected nano crystalline piezoelectric particles into sol-gel solution of PZT to form a uniform stable dispersion, slurry, or paste; depositing stable dispersion, slurry, or paste on electrode layer **coated** silicon wafer using spin-coating or screen-printing; and heating **coated** silicon wafer at temperature of at most 800 deg. C to produce dense, thick piezoelectric composite **coating** with thickness between 1-100 μm on silicon wafer.

USE - The invention is for depositing dense, thick piezoelectric composite **coatings** with uniform microstructure on an electrode layer **coated** silicon **substrate** to produce porous bioactive implant (claimed). It is also used to produce multi-layered devices, e.g. capacitors, transformers, resonators, filters, and actuators at very low sintering temperatures.

ADVANTAGE - The invention reduces agglomeration of the nano crystalline particles, produces more homogeneously packed green body with relatively higher density, and promotes and controls the nucleation of primary crystallization to produce more homogeneous microstructure with finer size.

DESCRIPTION OF DRAWING(S) - The figure shows the production of dense nano crystalline composites.

Dwg.1/1

TECH WO 2003099741 A1UPTX: 20040123

TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Component: The nano crystalline piezoelectric particles comprise PZT, lead lanthanum zirconium titanate (PLZT), lead magnesium niobate (PMN), lead zirconium niobate (PZN), barium strontium titanate (BST), lead titanate (PT), barium titanate (BT), PMN-PT, PZN-PT, or any other composition with good piezoelectric properties. The sol-gel solution is zirconium dioxide, cerium dioxide, titanium dioxide, aluminum trioxide, silicon dioxide, yttria stabilized zirconia, ceria stabilized zirconia, or bioactive materials. The nanocrystalline bioactive particles comprises hydroxyapatite and beta-calcium phosphate and other bioactive materials. Preferred Process: The deposition of dense, thick piezoelectric composite **coatings** with uniform microstructure on an electrode layer **coated** silicon **substrate** further includes repeating steps to form multilayered structure, and providing photolithography to form a piezoelectric transducer.

Preferred Property: The porous **substrate** comprises metal foams and porous ceramics with distributed open pore size of 50-400 μm .

TECHNOLOGY FOCUS - ELECTRONICS - Preferred Component: The piezoelectric transducer comprises multilayered structure of **electrode**

top layer(s), patterned piezoelectric composite layer (s), bottom electrode layer(s), and substrate layer(s). The multilayered structure comprises cantilever, bridge, and diaphragm structures. The transducer is further arranged to form transducer array(s). It transduces ultrasound energy from or to other forms of energy.

FS CPI EPI

FA AB; GI

MC CPI: A12-E15; L03-D01B; L03-D04D

EPI: V01-B01A; V01-B03C3A; V06-L01A; V06-L01A3; V06-M06D

L25 ANSWER 7 OF 8 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN

AN 1996-040899 [05] WPIX

DNN N1996-034333 DNC C1996-013827

TI Electronic thin layer constructional unit - has improved electrode layers of electrically conducting oxide cpds. which adheres better, electrically conducts well and show no appearance of fatigue.

DC L03 U12 U14 V01

IN BRAND, H; JUNGK, H; KLEE, M K

PA (PHIG) PHILIPS PATENTVERWALTUNG GMBH; (PHIG) PHILIPS ELECTRONICS NV;

(PHIG) PHILIPS GLOEILAMPENFAB NV; (PHIG) US PHILIPS CORP

CYC 6

PI DE 4421007 A1 19951221 (199605)* 9 H01G004-08

EP 689249 A2 19951227 (199605) GE 12 H01L029-43 <--

R: DE FR GB NL

JP 08045781 A 19960216 (199617) 10 H01G004-33

EP 689249 A3 19970910 (199746) H01G004-08

US 5995359 A 19991130 (200003) H01G004-008

ADT DE 4421007 A1 DE 1994-4421007 19940618; EP 689249 A2 EP 1995-201577

19950614; JP 08045781 A JP 1995-151946 19950619; EP 689249 A3 EP

1995-201577 19950614; US 5995359 A CIP of US 1995-492467 19950619, US

1997-859796 19970519

PRAI DE 1994-4421007 19940618

REP No-SR.Pub; 2.Jnl.Ref; EP 495114; EP 609081; US 5164808; WO 9321637

IC ICM H01G004-008; H01G004-08; H01G004-33; H01L029-43

ICS C23C022-00; C23C022-82; C23C026-00

ICA H01C007-00

AB DE 4421007 A UPAB: 19960205

The electronic thin layer constructional unit comprises a

substrate, electrode layers for a lower**electrode, a top electrode** and opt. one or**several electrodes in between, and functional layers****in between.** The **electrode** layers contain electrically

conducting, oxide cpds.. At least one electrode layer comprises TiOx, with

1 at most x at most 2, EuOx with 1 at most x at most 2, LiTi2O4, LiV2O4,

SrVO3, ErxNbO3 with 0.65 at most x at most 0.92, RbWO3, NaxWO3,

A2P8W32O112 with A = K, Rb, Tl, NaxTayW1-yO3 with x = 0.64 and x-y = 0.18,

Na1-xSrxNbO3, LiTiO3, CeTiO3, CaVO3, La1-xSrxVO3, SrCoO3, CaRuO3, SrRuO3,

BaRuO3, BaPbO3, SrMoO3, Sr0.5La0.5O3, La4BaCu5O13-x, La2-xSrxCuO4-delta,

YBa2Cu3O7-delta, Bi2Sr2CaCu2O8+d, Bi2Sr2CuO6+d, Bi2Sr2Ca2Cu3O10+d,

Tl2Ba2CaCu2O8, TlBa2CuO6+d, Tl2Ba2Ca2Cu3O10, La4BaCu6O15, Gd1-xSrxVO3,

CaCrO3, SrFeO3, EuNbO3, SrIrO3, CaMoO3, BaMoO3, Bi3Ru3O11, VO2, CrO2,

MoO2, WO2, RhO2, PtO2, RuOx, with 1.5 at most x at most 2, IrOx, with 1.5

at most x at most 2, SnO2-d, La3Ni2O7, La3Ni3O10, M2V2O7-d with M = Tm,

Lu, M2Mo2O7 with M = Nd, Sm, Gd, Lu2Ru2O7, Pb2Ru2O7, Bi2Ru2O7, Pb2Os2O7,

Tl2Os2O7, Pb2Ir2O2, Tl2Rh2O7-d, K0.3MoO3, Rb0.3MoO3, MxV2O5 with M = Cu,

Na, Mo17O47 or Tl2O3-d or physical mixts. and/or solid solns. with each

other or up to 50 weight% of additional cpds. or metals.

Also claimed is a process for mfg. an electronic thin layer

constructional unit as above in which one or several electrode layers are

produced by coating a substrate or a functional intermediary layer with pure solns., solns. or suspensions containing starting cpds. for the electrically conducting oxide cpds. in organic solvent, using a wet chemical deposition process and then thermal treatment to form the electrically conducting oxide cpds..

USE - The constructional unit can be a discrete constructional unit or a multifunctional multicomponent system such as a non-aligned ferroelectric memory, dynamic read-write memory with selective access, integrated capacitors, thin layer actuators, thin layer resistances, piezoelectric sensors, piezoelectric transducers, pyroelectric sensors, electro-optical constructional units or modules with integrated passive constructional units (ICM).

ADVANTAGE - The electronic thin layer constructional unit has improved electrode layers which adhere better, electrically conduct well and show no appearance of fatigue.

Dwg.0/0

FS CPI EPI

FA AB

MC CPI: L03-A02; L03-D04D; L03-G04A; L04-C12A; L04-C14A
EPI: U12-C02X; U12-Q; U14-A03F; U14-E01A; V01-A01C; V01-A02C3A; V01-B03A;
V01-B03D1A; V01-B03D1G

L25 ANSWER 8 OF 8 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN

AN 1995-235525 [31] WPIX

DNN N1995-183806

TI Piezoelectric bimorph element for parts feeder, relay etc. - uses through hole in metal substrate to embed filling material within substrate.

DC V03 V04 V06

PA (SUMQ) SUMITOMO METAL IND LTD

CYC 1

PI JP 07142781 A 19950602 (199531)* 5 H01L041-09 <--

ADT JP 07142781 A JP 1993-148996 19930621

PRAI JP 1993-148996 19930621

IC ICM H01L041-09

AB JP 07142781 A UPAB: 19950810

The bimorph element consists of two piezoelectric substrates (12,13) lined on either surfaces with electrodes. Two such electrode coated piezoelectric substrates are layered on upper and lower surfaces of a metal substrate (11). A through hole with smaller area compared to that of the piezoelectric substrate, is formed in the metal substrate. Via this through hole, a filling agent (14) is embedded into the metal substrate. The electrodes are polarized.

ADVANTAGE - Avoids increase in thickness. Raises mechanical strength. Raises efficiency by securing large amplitude change in raising sensitivity.

Dwg.1/4

FS EPI

FA AB; GI

MC EPI: V03-D05; V04-V01; V06-M06D

=> file hcapl

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FILE COVERS 1907 - 22 Jun 2006 VOL 144 ISS 26
FILE LAST UPDATED: 21 Jun 2006 (20060621/ED)

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=> d que 115

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L1      1960 SEA FILE=HCAPLUS ABB=ON  PIEZOELECTR?(3A) (LAYER? OR INTERLAYER?
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L2      71 SEA FILE=HCAPLUS ABB=ON  L1 AND ELECTROSTRICT?
L3      98700 SEA FILE=HCAPLUS ABB=ON  ELECTRODE?(3A) (TOP OR BOTTOM OR UPPER
      OR LOWER OR BETWEEN OR TWO OR 2 OR STACK? OR BEYOND)
L4      21 SEA FILE=HCAPLUS ABB=ON  L2 AND L3
L5      2 SEA FILE=HCAPLUS ABB=ON  L4 AND (GAP OR PROJECT?)
L6      4 SEA FILE=HCAPLUS ABB=ON  L4 AND COAT?
L7      11 SEA FILE=HCAPLUS ABB=ON  L4 AND SUBSTRAT?
L8      2 SEA FILE=HCAPLUS ABB=ON  L4 AND (POLYMER? OR OLIGOMER? OR
      VINYL? OR EPOX? OR POLYURETHANE? OR POLYESTER? OR POLYCARBONATE
      ? OR POLYSILOXANE? OR SILOXANE? OR URETHANE?)
L9      375 SEA FILE=HCAPLUS ABB=ON  L1 AND L3
L10     26 SEA FILE=HCAPLUS ABB=ON  L9 AND (POLYMER? OR OLIGOMER? OR
      VINYL? OR EPOX? OR POLYURETHANE? OR POLYESTER? OR POLYCARBONATE
      ? OR POLYSILOXANE? OR SILOXANE? OR URETHANE?)
L11     8 SEA FILE=HCAPLUS ABB=ON  L10 AND SUBSTRAT?
L12     34 SEA FILE=HCAPLUS ABB=ON  L9 AND COAT?
L13     3 SEA FILE=HCAPLUS ABB=ON  L12 AND (GAP OR PROJECT?)
L14     16 SEA FILE=HCAPLUS ABB=ON  L12 AND SUBSTRAT?
L15     31 SEA FILE=HCAPLUS ABB=ON  (L5 OR L6 OR L7 OR L8) OR L11 OR L13
      OR L14
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=> file compendex

FILE 'COMPENDEX' ENTERED AT 15:37:03 ON 22 JUN 2006

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<20060619/UP>

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=> d que 127

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L3      98700 SEA FILE=HCAPLUS ABB=ON  ELECTRODE?(3A) (TOP OR BOTTOM OR UPPER
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OR LOWER OR BETWEEN OR TWO OR 2 OR STACK? OR BEYOND)

L4 21 SEA FILE=HCAPLUS ABB=ON L2 AND L3

L5 2 SEA FILE=HCAPLUS ABB=ON L4 AND (GAP OR PROJECT?)

L6 4 SEA FILE=HCAPLUS ABB=ON L4 AND COAT?

L7 11 SEA FILE=HCAPLUS ABB=ON L4 AND SUBSTRAT?

L8 2 SEA FILE=HCAPLUS ABB=ON L4 AND (POLYMER? OR OLIGOMER? OR VINYL? OR EPOX? OR POLYURETHANE? OR POLYESTER? OR POLYCARBONATE ? OR POLYSILOXANE? OR SILOXANE? OR URETHANE?)

L9 375 SEA FILE=HCAPLUS ABB=ON L1 AND L3

L10 26 SEA FILE=HCAPLUS ABB=ON L9 AND (POLYMER? OR OLIGOMER? OR VINYL? OR EPOX? OR POLYURETHANE? OR POLYESTER? OR POLYCARBONATE ? OR POLYSILOXANE? OR SILOXANE? OR URETHANE?)

L11 8 SEA FILE=HCAPLUS ABB=ON L10 AND SUBSTRAT?

L12 34 SEA FILE=HCAPLUS ABB=ON L9 AND COAT?

L13 3 SEA FILE=HCAPLUS ABB=ON L12 AND (GAP OR PROJECT?)

L14 16 SEA FILE=HCAPLUS ABB=ON L12 AND SUBSTRAT?

L27 0 SEA FILE=COMPENDEX ABB=ON (L5 OR L6 OR L7 OR L8) OR L11 OR L13 OR L14

=> file jicst

FILE 'JICST-EPLUS' ENTERED AT 15:37:19 ON 22 JUN 2006

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=> d que 126

L1 1960 SEA FILE=HCAPLUS ABB=ON PIEZOELECTR?(3A) (LAYER? OR INTERLAYER?)

L2 71 SEA FILE=HCAPLUS ABB=ON L1 AND ELECTROSTRICT?

L3 98700 SEA FILE=HCAPLUS ABB=ON ELECTRODE?(3A) (TOP OR BOTTOM OR UPPER OR LOWER OR BETWEEN OR TWO OR 2 OR STACK? OR BEYOND)

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L5 2 SEA FILE=HCAPLUS ABB=ON L4 AND (GAP OR PROJECT?)

L6 4 SEA FILE=HCAPLUS ABB=ON L4 AND COAT?

L7 11 SEA FILE=HCAPLUS ABB=ON L4 AND SUBSTRAT?

L8 2 SEA FILE=HCAPLUS ABB=ON L4 AND (POLYMER? OR OLIGOMER? OR VINYL? OR EPOX? OR POLYURETHANE? OR POLYESTER? OR POLYCARBONATE ? OR POLYSILOXANE? OR SILOXANE? OR URETHANE?)

L9 375 SEA FILE=HCAPLUS ABB=ON L1 AND L3

L10 26 SEA FILE=HCAPLUS ABB=ON L9 AND (POLYMER? OR OLIGOMER? OR VINYL? OR EPOX? OR POLYURETHANE? OR POLYESTER? OR POLYCARBONATE ? OR POLYSILOXANE? OR SILOXANE? OR URETHANE?)

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L12 34 SEA FILE=HCAPLUS ABB=ON L9 AND COAT?

L13 3 SEA FILE=HCAPLUS ABB=ON L12 AND (GAP OR PROJECT?)

L14 16 SEA FILE=HCAPLUS ABB=ON L12 AND SUBSTRAT?

L26 1 SEA FILE=JICST-EPLUS ABB=ON (L5 OR L6 OR L7 OR L8) OR L11 OR L13 OR L14

=> file inspec

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<<< INSPEC HAS BEEN RELOADED AND ENHANCED --> SEE NEWS
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=> d que 128

L1 1960 SEA FILE=HCAPLUS ABB=ON PIEZOELECTR?(3A) (LAYER? OR INTERLAYER?
)
L2 71 SEA FILE=HCAPLUS ABB=ON L1 AND ELECTROSTRICT?
L3 98700 SEA FILE=HCAPLUS ABB=ON ELECTRODE?(3A) (TOP OR BOTTOM OR UPPER
OR LOWER OR BETWEEN OR TWO OR 2 OR STACK? OR BEYOND)
L4 21 SEA FILE=HCAPLUS ABB=ON L2 AND L3
L5 2 SEA FILE=HCAPLUS ABB=ON L4 AND (GAP OR PROJECT?)
L6 4 SEA FILE=HCAPLUS ABB=ON L4 AND COAT?
L7 11 SEA FILE=HCAPLUS ABB=ON L4 AND SUBSTRAT?
L8 2 SEA FILE=HCAPLUS ABB=ON L4 AND (POLYMER? OR OLIGOMER? OR
VINYL? OR EPOX? OR POLYURETHANE? OR POLYESTER? OR POLYCARBONATE
? OR POLYSILOXANE? OR SILOXANE? OR URETHANE?)
L9 375 SEA FILE=HCAPLUS ABB=ON L1 AND L3
L10 26 SEA FILE=HCAPLUS ABB=ON L9 AND (POLYMER? OR OLIGOMER? OR
VINYL? OR EPOX? OR POLYURETHANE? OR POLYESTER? OR POLYCARBONATE
? OR POLYSILOXANE? OR SILOXANE? OR URETHANE?)
L11 8 SEA FILE=HCAPLUS ABB=ON L10 AND SUBSTRAT?
L12 34 SEA FILE=HCAPLUS ABB=ON L9 AND COAT?
L13 3 SEA FILE=HCAPLUS ABB=ON L12 AND (GAP OR PROJECT?)
L14 16 SEA FILE=HCAPLUS ABB=ON L12 AND SUBSTRAT?
L28 5 SEA FILE=INSPEC ABB=ON (L5 OR L6 OR L7 OR L8) OR L11 OR L13
OR L14

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PROCESSING COMPLETED FOR L26
PROCESSING COMPLETED FOR L28
L29 37 DUP REM L15 L26 L28 (0 DUPLICATES REMOVED)

=> d 129 all 1-37

L29 ANSWER 1 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:15707 HCAPLUS
DN 142:105391
ED Entered STN: 07 Jan 2005
TI Method of manufacturing film bulk acoustic resonator using internal stress
of metallic film and resonator manufactured thereby
IN Kim, Jong-Seok; Choa, SungHoon; Song, In-Sang; Hong, Young-Tack
PA Samsung Electronics Co., Ltd., S. Korea

SO U.S. Pat. Appl. Publ., 10 pp.
 CODEN: USXXCO
 DT Patent
 LA English
 IC ICM H01L021-00
 ICS H01L027-14; H01L029-82
 INCL 257414000; 438048000; 438052000; 257416000
 CC 76-7 (Electric Phenomena)
 Section cross-reference(s): 48

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 2005001274	A1	20050106	US 2004-838326	20040505
PRAI KR 2003-32651	A	20030522		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 2005001274	ICM	H01L021-00
	ICS	H01L027-14; H01L029-82
	INCL	257414000; 438048000; 438052000; 257416000
	IPCI	H01L0021-00 [ICM,7]; H01L0027-14 [ICS,7]; H01L0029-82 [ICS,7]; H01L0029-66 [ICS,7,C*]
	IPCR	H03H0003-00 [I,C*]; H03H0003-02 [I,A]
	NCL	257/414.000
	ECLA	H03H003/02; H03H009/02B8; H03H009/17A1

AB A method of manufacturing a film bulk acoustic resonator and the resonator manufactured thereby. The method includes the laminating a sacrificial layer on a semiconductor **substrate**, removing a predetd. area from the sacrificial layer to realize elec. contact between a signal line of the semiconductor **substrate** and a **lower electrode**, forming the **lower electrode** by depositing metal film for **lower electrode** on the sacrificial layer, by patterning based on a shape of the sacrificial **layer**, forming a **piezoelec. layer** by depositing a **piezoelec.** material on the **lower electrode** and by patterning based on a shape of the **lower electrode**, and forming an **upper electrode** by depositing metal film on the **piezoelec. layer** and by patterning based on a shape of the **piezoelec. layer**, wherein at least one of a deposition pressure and a deposition power is controlled to generate upward stress when depositing the metal film for the **lower electrode**.

ST acoustic resonator metal film fabrication

IT Resonators

(acoustic; fabrication of acoustic resonators)

IT Cantilevers (components)

Electric contacts

Interconnections, electric

(fabrication of acoustic resonators)

IT Piezoelectric materials

(films; in fabrication of acoustic resonators)

IT Coating process

Lamination

Lithography

(in fabrication of acoustic resonators)

IT Metals, processes

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)

(in fabrication of acoustic resonators)

IT Resonators

(piezoelec.; fabrication of acoustic resonators)
 IT Films
 (piezoelec.; in fabrication of acoustic resonators)
 IT Surface acoustic wave devices
 (resonators; fabrication of acoustic resonators)

L29 ANSWER 2 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
 AN 2005:963367 HCAPLUS
 DN 143:240077
 ED Entered STN: 02 Sep 2005
 TI Piezoelectric components, manufacture of piezoelectric components, and
 liquid injection heads
 IN Li, Jin-Shan
 PA Seiko Epson Corp., Japan
 SO Jpn. Kokai Tokkyo Koho, 14 pp.
 CODEN: JKXXAF

DT Patent
 LA Japanese
 IC ICM H01L041-22
 ICS B41J002-045; B41J002-055; B41J002-16; H01L041-09; H01L041-18;
 H01L041-187

CC 76-7 (Electric Phenomena)
 Section cross-reference(s): 56, 57

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 2005236269	A2	20050902	JP 2005-4356	20050111
US 2005236929	A1	20051027	US 2005-40090	20050124
PRAI JP 2004-16256	A	20040123		
JP 2005-4356	A	20050111		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2005236269	ICM	H01L041-22
	ICS	B41J002-045; B41J002-055; B41J002-16; H01L041-09; H01L041-18; H01L041-187
	IPCI	H01L0041-22 [ICM,7]; B41J0002-045 [ICS,7]; B41J0002-055 [ICS,7]; B41J0002-16 [ICS,7]; H01L0041-09 [ICS,7]; H01L0041-18 [ICS,7]; H01L0041-187 [ICS,7]
	IPCR	B41J0002-045 [I,A]; B41J0002-045 [I,C*]; B41J0002-055 [I,A]; B41J0002-055 [I,C*]; B41J0002-16 [I,A]; B41J0002-16 [I,C*]; H01L0041-08 [I,A]; H01L0041-08 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-18 [I,A]; H01L0041-18 [I,C*]; H01L0041-187 [I,A]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]
	FTERM	2C057/AF03; 2C057/AF93; 2C057/AG12; 2C057/AG42; 2C057/AG44; 2C057/AP14; 2C057/AP52; 2C057/AP57; 2C057/BA03; 2C057/BA14
US 2005236929	IPCI	H01L0041-08 [ICM,7]
	IPCR	B41J0002-045 [I,A]; B41J0002-045 [I,C*]; B41J0002-055 [I,A]; B41J0002-055 [I,C*]; B41J0002-16 [I,A]; B41J0002-16 [I,C*]; H01L0041-08 [I,A]; H01L0041-08 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-18 [I,A]; H01L0041-18 [I,C*]; H01L0041-187 [I,A]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]
	NCL	310/311.000

AB The process for the title manufacture of piezoelec. components involves (1)
 repeatedly coating Ti seeds over a lower
 electrode on a substrate, (2) coating
 a piezoelec. precursor material over the Ti seed-coated layer on

the lower electrode, and (3) sintering the precursor layer to be crystallized in formation of a piezoelec. layer. The process provides a homogeneously formed and quality-improved piezoelec. layer to piezoelec. components and consequently to liquid injection heads.

ST titanium seed coating piezoelec sintering crystn liq injection head

IT Piezoelectric materials
(films; piezoelec. components, manufacture of piezoelec. components, and liquid injection heads)

IT Sputtering
(of titanium seed layer; piezoelec. components, manufacture of piezoelec. components, and liquid injection heads)

IT Ink-jet printer heads
Piezoelectric materials
Piezoelectric transducers
(piezoelec. components, manufacture of piezoelec. components, and liquid injection heads)

IT Films
(piezoelec.; piezoelec. components, manufacture of piezoelec. components, and liquid injection heads)

IT 7631-86-9, Silica, properties
RL: PRP (Properties)
(elastic film for piezoelec. layer; piezoelec. components, manufacture of piezoelec. components, and liquid injection heads)

IT 1314-23-4, Zirconia, properties
RL: PRP (Properties)
(insulator film for piezoelec. layer; piezoelec. components, manufacture of piezoelec. components, and liquid injection heads)

IT 12626-81-2P, Lead titanate zirconate
RL: DEV (Device component use); PNU (Preparation, unclassified); PRP (Properties); PREP (Preparation); USES (Uses)
(piezoelec. layer, formation on titanium seed layer; piezoelec. components, manufacture of piezoelec. components, and liquid injection heads)

IT 7440-32-6P, Titanium, uses
RL: CAT (Catalyst use); PNU (Preparation, unclassified); PREP (Preparation); USES (Uses)
(seed layer sputtered for piezoelec. film formation; piezoelec. components, manufacture of piezoelec. components, and liquid injection heads)

L29 ANSWER 3 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2005:586921 HCAPLUS

DN 143:106397

ED Entered STN: 08 Jul 2005

TI Ink-jet printers, piezoelectric heads therefor, manufacture thereof employing dry-film photoresists, and alkaline developers for precise patterning thereof

IN Hirasawa, Hiroshi

PA Matsushita Electric Industrial Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 18 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM B41J002-16

ICS B41J002-045; B41J002-055; B81C001-00; G03F007-004; G03F007-32

CC 74-6 (Radiation Chemistry, Photochemistry, and Photographic and Other

Reprographic Processes)

Section cross-reference(s): 56, 76

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 2005178054	A2	20050707	JP 2003-419041	20031217
PRAI JP 2003-419041		20031217		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2005178054	ICM	B41J002-16
	ICS	B41J002-045; B41J002-055; B81C001-00; G03F007-004; G03F007-32
	IPCI	B41J0002-16 [ICM,7]; B41J0002-045 [ICS,7]; B41J0002-055 [ICS,7]; B81C0001-00 [ICS,7]; G03F0007-004 [ICS,7]; G03F0007-32 [ICS,7]
	IPCR	B41J0002-045 [I,A]; B41J0002-045 [I,C*]; B41J0002-055 [I,A]; B41J0002-055 [I,C*]; B41J0002-16 [I,A]; B41J0002-16 [I,C*]; B81C0001-00 [I,A]; B81C0001-00 [I,C*]; G03F0007-004 [I,A]; G03F0007-004 [I,C*]; G03F0007-32 [I,A]; G03F0007-32 [I,C*]
	FTERM	2C057/AF40; 2C057/AF93; 2C057/AG14; 2C057/AG39; 2C057/AG44; 2C057/AG52; 2C057/AG55; 2C057/AN01; 2C057/AP02; 2C057/AP22; 2C057/AP25; 2C057/AP33; 2C057/AP37; 2C057/AP38; 2C057/AP47; 2C057/AP52; 2C057/AP55; 2C057/AQ06; 2C057/BA04; 2C057/BA14; 2H025/AA04; 2H025/AB20; 2H025/AD01; 2H025/AD03; 2H025/EA08; 2H025/FA17; 2H096/AA30; 2H096/BA01; 2H096/BA09; 2H096/CA16; 2H096/GA09; 2H096/GA11

AB The developers contain alkali and/or alkaline earth metal compds. and surfactants. The piezoelec. heads are manufactured by (i) forming lower and upper electrode layers and piezoelec. layers between them on substrates to give laminates, (ii) laminating alkali-developable dry-film photoresists on the laminates on the other side of the substrates, (iii) exposing the photoresists via masks, (iv) developing with the above developers to have patterns, (v) filling grooves, formed by removal of the photoresists, by (electroless) plating to give sidewalls for ink tanks, (vi) removing the residual photoresists to give the tanks, and (v) covering them with discharge hole-equipped nozzle plates and removing the substrates. Also claimed are ink-jet printed equipped with the heads, means for transporting the heads relatively to receptors, and means for supplying recording signals on the heads.

ST ink jet printer piezoelec head patterning; dry film photoresist alkali developer surfactant; photoresist precise patterning nickel plating printer head

IT Alkali metal compounds

RL: TEM (Technical or engineered material use); USES (Uses)

(developers; manufacture of piezoelec. heads for ink-jet printers by precise patterning of dry-film photoresists with alkaline developers and subsequent plating)

IT Photoresists

(dry-film; manufacture of piezoelec. heads for ink-jet printers by precise patterning of dry-film photoresists with alkaline developers and subsequent plating)

IT Coating process

(electroless; manufacture of piezoelec. heads for ink-jet printers by precise patterning of dry-film photoresists with alkaline developers and subsequent plating)

IT Ink-jet printer heads

Ink-jet printers
 Photolithography
 Piezoelectric apparatus
 (manufacture of piezoelec. heads for ink-jet printers by precise patterning
 of dry-film photoresists with alkaline developers and subsequent plating)

IT Alkaline earth compounds
 RL: TEM (Technical or engineered material use); USES (Uses)
 (manufacture of piezoelec. heads for ink-jet printers by precise patterning
 of dry-film photoresists with alkaline developers and subsequent plating)

IT Coating process
 (plating; manufacture of piezoelec. heads for ink-jet printers by precise
 patterning of dry-film photoresists with alkaline developers and subsequent
 plating)

IT 7440-02-0, N 100ES, uses
 RL: DEV (Device component use); TEM (Technical or engineered material
 use); USES (Uses)
 (N 100ES, N 1000, plating; manufacture of piezoelec. heads for ink-jet
 printers by precise patterning of dry-film photoresists with alkaline
 developers and subsequent plating)

IT 497-19-8, Sodium carbonate, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (developers; manufacture of piezoelec. heads for ink-jet printers by precise
 patterning of dry-film photoresists with alkaline developers and subsequent
 plating)

IT 7440-06-4, Platinum, uses 7440-50-8, Copper, uses
 RL: DEV (Device component use); TEM (Technical or engineered material
 use); USES (Uses)
 (electrodes; manufacture of piezoelec. heads for ink-jet printers by precise
 patterning of dry-film photoresists with alkaline developers and subsequent
 plating)

IT 857082-38-3, AR 340
 RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical
 process); PYP (Physical process); PROC (Process); USES (Uses)
 (manufacture of piezoelec. heads for ink-jet printers by precise patterning
 of dry-film photoresists with alkaline developers and subsequent plating)

IT 12597-68-1, Stainless steel, uses
 RL: DEV (Device component use); TEM (Technical or engineered material
 use); USES (Uses)
 (nozzle plates; manufacture of piezoelec. heads for ink-jet printers by
 precise patterning of dry-film photoresists with alkaline developers and
 subsequent plating)

IT 107478-15-9, Lead titanium zirconium oxide (PbTi_{0.47}Zr_{0.53}O₃)
 RL: DEV (Device component use); TEM (Technical or engineered material
 use); USES (Uses)
 (piezoelec. layers; manufacture of piezoelec.
 heads for ink-jet printers by precise patterning of dry-film
 photoresists with alkaline developers and subsequent plating)

IT 112-02-7 5168-91-2 25155-30-0 70656-69-8
 RL: MOA (Modifier or additive use); TEM (Technical or engineered material
 use); USES (Uses)
 (surfactants; manufacture of piezoelec. heads for ink-jet printers by
 precise patterning of dry-film photoresists with alkaline developers and
 subsequent plating)

L29 ANSWER 4 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
 AN 2005:563944 HCAPLUS
 DN 143:70067
 ED Entered STN: 30 Jun 2005
 TI Fabrication of piezoelectric device
 IN Muramoto, Miyuki; Murai, Masami

PA Seiko Epson Corp., Japan.
 SO Jpn. Kokai Tokkyo Koho, 10 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM H01L041-22
 ICS B41J002-16; H01L041-09; H01L041-187
 CC 76-7 (Electric Phenomena)
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2005175230	A2	20050630	JP 2003-413981	20031211
PRAI	JP 2003-413981		20031211		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2005175230	ICM	H01L041-22
	ICS	B41J002-16; H01L041-09; H01L041-187
	IPCI	H01L0041-22 [ICM,7]; B41J0002-16 [ICS,7]; H01L0041-09 [ICS,7]; H01L0041-187 [ICS,7]; H01L0041-18 [ICS,7,C*]
	IPCR	B41J0002-16 [I,A]; B41J0002-16 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-18 [I,C*]; H01L0041-187 [I,A]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]
	FTERM	2C057/AF93; 2C057/AG47; 2C057/AP14; 2C057/AP57; 2C057/BA14

AB A method for fabricating a durable piezoelec. device involves forming a **bottom electrode** on a **substrate**, removing the surface water of the **substrate**, **coating** the **substrate** with a precursor film of a piezoelec. material, firing the precursor film to form a **piezoelec. layer**, and forming a **top electrode** on the **piezoelec. layer**. Optionally, the surface water may be removed by heating and/or HMDS treatment, and the precursor film may be formed by a sol-gel method.

ST piezoelec device fabrication coating

IT Coating process

Piezoelectric apparatus

Sol-gel processing

(fabrication of piezoelec. device by coating)

IT 999-97-3, Hexamethyldisilazane

RL: NUU (Other use, unclassified); USES (Uses)

(fabrication of piezoelec. device by coating)

IT 7732-18-5, Water, processes

RL: REM (Removal or disposal); PROC (Process)

(fabrication of piezoelec. device by coating)

L29 ANSWER 5 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2004:100563 HCAPLUS

DN 140:155784

ED Entered STN: 08 Feb 2004

TI Manufacturing method of piezoelectric/electrostrictive film type device

IN Ohnishi, Takao; Murasato, Masahiro; Bessho, Yuki; Takahashi, Nobuo

PA Ngk Insulators, Ltd., Japan

SO U.S. Pat. Appl. Publ., 26 pp.

CODEN: USXXCO

DT Patent

LA English

IC ICM B05D005-12

ICS B05D003-02; G21H001-00
 INCL 427100000; 427372200; 427457000; 427402000
 CC 76-7 (Electric Phenomena)
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE	
PI	US 2004022935	A1	20040205	<u>US 2003-630887</u>	20030730	
	WO 2004013918	A1	20040212	WO 2003-JP9609	20030729	
	W:			AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW		
	RW:			GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG		
	AU 2003252300	A1	20040223	AU 2003-252300	20030729	
PRAI	US 2002-400513P	P	20020802			
	WO 2003-JP9609	W	20030729			

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 2004022935	ICM	B05D005-12
	ICS	B05D003-02; G21H001-00
	INCL	427100000; 427372200; 427457000; 427402000
	IPCI	B05D0005-12 [ICM,7]; B05D0003-02 [ICS,7]; G21H0001-00 [ICS,7]
	IPCR	H01L0041-09 [N,A]; H01L0041-09 [N,C*]; H01L0041-24 [I,A]; H01L0041-24 [I,C*]
	NCL	427/100.000
	ECLA	H01L041/24
WO 2004013918	IPCI	H01L0041-09 [ICM,7]; H01L0041-22 [ICS,7]; B41J0002-045 [ICS,7]
	IPCR	H01L0041-09 [N,A]; H01L0041-09 [N,C*]; H01L0041-24 [I,A]; H01L0041-24 [I,C*]
	ECLA	H01L041/24
AU 2003252300	IPCI	H01L0041-09 [ICM,7]; H01L0041-22 [ICS,7]; B41J0002-045 [ICS,7]
	IPCR	H01L0041-09 [N,A]; H01L0041-09 [N,C*]; H01L0041-24 [I,A]; H01L0041-24 [I,C*]

AB The invention relates to a process for making a piezoelec./electrostrictive film type device including a ceramic substrate, a piezoelec./electrostrictive operation portion containing a lower electrode, a piezoelec./electrostrictive layer, and upper electrode stacked on the substrate, and the piezoelec./electrostrictive layer being formed beyond at least one of electrodes to form projected portions at its ends, the method comprising the steps of forming the piezoelec./electrostrictive layer beyond at least one of electrodes to project ends of the layer; applying a coating liquid in an amount sufficient to make the coating liquid permeate through a gap between at least a projected portion of the piezoelec./electrostrictive layer and the substrate, and coat a predetd. portion of said at least one of electrodes; and drying thus applied coating liquid to form a coupling member to couple a projected portion of the piezoelec./

electrostrictive layer. The piezoelec./
electrostrictive operation portion may be a multilayered
structure.

ST dpiezoelec electrostrictive film coating

IT Electrostriction

(apparatus; manufacture of piezoelec./electrostrictive film type
device)

IT Piezoelectric materials

(films; manufacture of piezoelec./electrostrictive film type
device)

IT Coating process

(manufacture of piezoelec./electrostrictive film type device)

IT Films

(piezoelec.; manufacture of piezoelec./electrostrictive film type
device)

L29 ANSWER 6 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2004:722623 HCAPLUS

DN 141:234456

ED Entered STN: 03 Sep 2004

TI Fabrication of piezoelectric device

IN Yamada, Kazuhiro

PA Murata Mfg. Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 6 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01L041-22

ICS H01L041-08

CC 76-7 (Electric Phenomena)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2004247406	A2	20040902	JP 2003-33855	20030212
PRAI	JP 2003-33855		20030212		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2004247406	ICM	H01L041-22
	ICS	H01L041-08
	IPCI	H01L0041-22 [ICM,7]; H01L0041-08 [ICS,7]
	IPCR	H01L0041-08 [I,A]; H01L0041-08 [I,C*]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]

AB A method for fabricating a piezoelec. device at a high yield involves
preparing a Si substrate having silica layers on both of its major
sides, forming a bottom electrode layer,
piezoelec. layer, and top electrode
layer on the first silica layer via an optional middle layer,
coating the first silica layer with a thermally hardened
fluoropolymer, forming a resist pattern on the second silica layer, wet
etching the substrate using the pattern to form a diaphragm
structure, and removing the fluoropolymer.

ST silicon piezoelec device fabrication wet etching

IT Etching

Piezoelectric apparatus

(fabrication of silicon piezoelec. device by wet etching)

IT Fluoropolymers, uses

RL: NUU (Other use, unclassified); USES (Uses)

(fabrication of silicon piezoelec. device by wet etching)

IT 7440-21-3, Silicon, processes

RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(fabrication of silicon piezoelec. device by wet etching)

L29 ANSWER 7 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:530511 HCAPLUS
DN 141:63442
ED Entered STN: 02 Jul 2004
TI Piezoelectric/**electrostrictive** membrane type elements
IN Takahashi, Nobuo; Yamaguchi, Hirofumi
PA NGK Insulators, Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 9 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H01L041-09
ICS C04B035-46; H01L041-187; H01L041-193
CC 76-7 (Electric Phenomena)
Section cross-reference(s): 57

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2004186436	A2	20040702	JP 2002-351694	20021203
PRAI	JP 2002-351694		20021203		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2004186436	ICM	H01L041-09
	ICS	C04B035-46; H01L041-187; H01L041-193
	IPCI	H01L0041-09 [ICM,7]; C04B0035-46 [ICS,7]; H01L0041-187 [ICS,7]; H01L0041-193 [ICS,7]; H01L0041-18 [ICS,7,C*]
	IPCR	C04B0035-46 [I,A]; C04B0035-46 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-18 [I,C*]; H01L0041-187 [I,A]; H01L0041-193 [I,A]
	FTERM	4G031/AA01; 4G031/AA02; 4G031/AA07; 4G031/AA08; 4G031/AA11; 4G031/AA35; 4G031/BA10; 4G031/CA08

AB The title elements consist of a ceramic **substrate**, a lower section **electrode** and auxiliary electrodes, piezoelec./**electrostrictive** membrane, an upper **electrode**, and a (Bi_{0.5}Na_{0.5})TiO₃-based binder layer, where between the ceramic **substrate** and the binder layer, there exists an uneven-distributed layer (thickness 1-5 μm) containing the components contained in the ceramic **substrate** and/or the binder layer. Preferably, the ceramic **substrate** is made of ZrO₂-based material.

ST piezoelec **electrostrictive** membrane element ceramic **substrate**.

IT Ceramics

Electrostriction

Membranes, nonbiological

Piezoelectric materials

(piezoelec./**electrostrictive** membrane type elements having ceramic **substrates**, binder layer and uneven-distributed layer in between)

IT 1305-78-8, Calcia, uses 1312-81-8, Lanthanum oxide 1314-36-9, Yttria, uses 7631-86-9, Silica, uses

RL: MOA (Modifier or additive use); USES (Uses)

(binder layer containing; piezoelec./

electrostrictive membrane type elements having ceramic

substrates, binder layer and uneven-distributed layer in

between)
 IT 12233-00-0, Bismuth sodium titanium oxide ($\text{Bi}_{0.5}\text{Na}_{0.5}\text{TiO}_3$)
 RL: TEM (Technical or engineered material use); USES (Uses)
 (binder layer containing; piezoelec./
 electrostrictive membrane type elements having ceramic
 substrates, binder layer and uneven-distributed layer in
 between)
 IT 1314-23-4, Zirconia, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (ceramic substrates; piezoelec./electrostrictive
 membrane type elements having ceramic substrates, binder
 layer and uneven-distributed layer in between)

L29 ANSWER 8 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
 AN 2004:390008 HCAPLUS
 DN 140:384701
 ED Entered STN: 13 May 2004
 TI Ultrathin multilayer ceramic piezoelectric device and its fabrication
 IN Handa, Shinichi
 PA Kyocera Corp., Japan
 SO Jpn. Kokai Tokkyo Koho, 12 pp.
 CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01L041-09

ICS B41J002-045; B41J002-055; B41J002-16; C04B035-622; H01L041-187;
 H01L041-22; H01L041-24

CC 76-7 (Electric Phenomena)

Section cross-reference(s): 74

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2004140193	A2	20040513	JP 2002-303547	20021017
	JP 2005223354	A2	20050818	JP 2005-95002	20050329
PRAI	JP 2002-303547	A3	20021017		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2004140193	ICM	H01L041-09
	ICS	B41J002-045; B41J002-055; B41J002-16; C04B035-622; H01L041-187; H01L041-22; H01L041-24
	IPCI	H01L0041-09 [ICM,7]; B41J0002-045 [ICS,7]; B41J0002-055 [ICS,7]; B41J0002-16 [ICS,7]; C04B0035-622 [ICS,7]; H01L0041-187 [ICS,7]; H01L0041-18 [ICS,7,C*]; H01L0041-22 [ICS,7]; H01L0041-24 [ICS,7]
	IPCR	B41J0002-045 [I,A]; B41J0002-045 [I,C*]; B41J0002-055 [I,A]; B41J0002-055 [I,C*]; B41J0002-16 [I,A]; B41J0002-16 [I,C*]; C04B0035-622 [I,A]; C04B0035-622 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-18 [I,C*]; H01L0041-187 [I,A]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]; H01L0041-24 [I,A]; H01L0041-24 [I,C*]
	FTERM	2C057/AF01; 2C057/AF37; 2C057/AF93; 2C057/AG12; 2C057/AG44; 2C057/AG47; 2C057/AG52; 2C057/AG92; 2C057/AG93; 2C057/AP02; 2C057/AP58; 2C057/AP90; 2C057/AQ10; 2C057/BA04; 2C057/BA14; 4G030/AA16; 4G030/AA17; 4G030/AA40; 4G030/BA10; 4G030/CA03; 4G030/CA07; 4G030/CA08; 4G030/GA19; 4G030/GA22
JP 2005223354	IPCI	H01L0041-22 [ICM,7]; B41J0002-045 [ICS,7]; B41J0002-055 [ICS,7]; H01L0041-09 [ICS,7]; H01L0041-187 [ICS,7];

H01L0041-18 [ICS,7,C*]; H01L0041-24 [ICS,7]
 IPCR B41J0002-045 [I,A]; B41J0002-045 [I,C*]; B41J0002-055
 [I,A]; B41J0002-055 [I,C*]; H01L0041-09 [I,A];
 H01L0041-09 [I,C*]; H01L0041-18 [I,C*]; H01L0041-187
 [I,A]; H01L0041-22 [I,A]; H01L0041-22 [I,C*];
 H01L0041-24 [I,A]; H01L0041-24 [I,C*]
 FTERM 2C057/AF23; 2C057/AG12; 2C057/AG44; 2C057/AG47;
 2C057/AP02; 2C057/AP14; 2C057/BA04; 2C057/BA14

AB The device comprises a multilayered ceramic **substrate** with
 thickness ≤ 50 μm on which multiple piezoelec. devices (each
 device comprises a **piezoelec. layer** sandwiched
between a pair of electrodes) with thickness ≤ 50
 μm are arranged, and have total thickness ≤ 100 μm with
 $\leq 10\%$ fluctuation. The device is fabricated by steps including tape
 slurry **coating** of an organic binder slurry containing piezoelec.
 ceramic powder with average particle size ≤ 1 μm , pressing, and
 firing. The devices provides precise amount of piezoelec. displacement, and
 are suitable for actuators of ink-jet printer heads.

ST piezoelec ceramic multilayer ultrathin manuf tape slurry **coating**
 ; ink jet printer head actuator piezoelec device

IT Ink-jet printer heads
 (actuators; ultrathin multilayer ceramic piezoelec. device fabricated
 by tape slurry **coating**, pressing, and firing)

IT Piezoelectric materials
 (ceramic, devices; ultrathin multilayer ceramic piezoelec. device
 fabricated by tape slurry **coating**, pressing, and firing)

IT Piezoelectric apparatus
 (ceramic, multilayer; ultrathin multilayer ceramic piezoelec. device
 fabricated by tape slurry **coating**, pressing, and firing)

IT Actuators
 (ink-jet printer heads; ultrathin multilayer ceramic piezoelec. device
 fabricated by tape slurry **coating**, pressing, and firing)

IT Ceramics
 (piezoelec., devices; ultrathin multilayer ceramic piezoelec. device
 fabricated by tape slurry **coating**, pressing, and firing)

IT Coating process
 (slurry, tape; ultrathin multilayer ceramic piezoelec. device
 fabricated by tape slurry **coating**, pressing, and firing)

IT 79-10-7D, Acrylic acid, derivs.
 RL: NUU (Other use, unclassified); USES (Uses)
 (binder; in fabrication of ultrathin multilayer ceramic piezoelec.
 device by tape slurry **coating**, pressing, and firing)

IT 12626-81-2, Lead titanate zirconate
 RL: PEP (Physical, engineering or chemical process); PYP (Physical
 process); TEM (Technical or engineered material use); PROC (Process); USES
 (Uses)
 (piezoelec. ceramic powder; in fabrication of ultrathin multilayer
 ceramic piezoelec. device by tape slurry **coating**, pressing,
 and firing)

L29 ANSWER 9 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2004:36779 HCAPLUS

DN 140:103396

ED Entered STN: 16 Jan 2004

TI Piezoelectric/**electrostrictive** film device with high resonance
 frequency and high speed response

IN Takahashi, Nobuo; Bessho, Yuki; Kobayashi, Nobuyuki; Murasato, Masahiro

PA NGK Insulators, Ltd., Japan

SO Eur. Pat. Appl., 32 pp.

CODEN: EPXXDW

DT Patent
 LA English
 IC ICM H01L041-09
 ICS H01L041-22
 CC 76-7 (Electric Phenomena)
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1381093	A2	20040114	EP 2003-254404	20030711
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
	US 2004007947	A1	20040115	US 2003-615545	20030708
	JP 2005050830	A2	20050224	JP 2003-193850	20030708
PRAI	US 2002-395503P	P	20020712		
	JP 2003-160430	A	20030605		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
EP 1381093	ICM	H01L041-09
	ICS	H01L041-22
	IPCI	H01L0041-09 [ICM,7]; H01L0041-22 [ICS,7]
	IPCR	H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]
	ECLA	H01L041/09G; H01L041/22
US 2004007947	IPCI	H02N0002-00 [ICM,7]; H01L0041-04 [ICS,7]; H01L0041-00 [ICS,7,C*]
	IPCR	H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]
	NCL	310/363.000
	ECLA	H01L041/09G; H01L041/22
JP 2005050830	IPCI	H01L0041-09 [ICM,7]; H01L0041-083 [ICS,7]; H01L0041-18 [ICS,7]; H01L0041-187 [ICS,7]; H01L0041-22 [ICS,7]; H02N0002-00 [ICS,7]
	IPCR	H01L0041-083 [I,A]; H01L0041-083 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-18 [I,A]; H01L0041-18 [I,C*]; H01L0041-187 [I,A]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]; H02N0002-00 [I,A]; H02N0002-00 [I,C*]
	FTERM	5H680/AA04; 5H680/AA06; 5H680/BC01; 5H680/BC04; 5H680/DD15; 5H680/DD23; 5H680/DD37; 5H680/DD39; 5H680/DD95; 5H680/FF17; 5H680/FF26; 5H680/GG11; 5H680/GG42; 5H680/GG43

AB The present invention discloses a piezoelec./electrostrictive film device which has a flexural displacement and durability equal to or more than those of a related-art piezoelec./electrostrictive film device and which has a remarkably high resonance frequency and which is superior in high-speed response. The piezoelec./electrostrictive film device comprises the following: a substrate formed of ceramic; and a piezoelec./electrostrictive operation portion including a lower electrode, piezoelec./electrostrictive layer, and upper electrode which are successively stacked on the substrate and including a projecting end of the piezoelec./electrostrictive layer with which an upper surface of the lower electrode and a lower surface of the upper electrode are coated. A projecting portion of the piezoelec./electrostrictive layer comprises a coupling member constituted of a hybrid material in which inorg. particles are scattered

in a matrix of a polymer compound, and is coupled to the substrate.

ST piezoelec electrostrictive film high resonance frequency

IT Piezoelectric materials
(ceramic; piezoelec./electrostrictive film device with high resonance frequency and high speed response)

IT Polysiloxanes, uses
RL: DEV (Device component use); USES (Uses)
(coupling particle; piezoelec./electrostrictive film device with high resonance frequency and high speed response)

IT Piezoelectric materials
(films; piezoelec./electrostrictive film device with high resonance frequency and high speed response)

IT Electric contacts
Electrostriction
Piezoelectric apparatus
(piezoelec./electrostrictive film device with high resonance frequency and high speed response)

IT Ceramics
Films
(piezoelec.; piezoelec./electrostrictive film device with high resonance frequency and high speed response)

IT Coating process
(spin; piezoelec./electrostrictive film device with high resonance frequency and high speed response)

IT 1314-36-9, Yttria, uses
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
(ZrO₂ stabilized with; piezoelec./electrostrictive film device with high resonance frequency and high speed response)

IT 7631-86-9, Silica, uses
RL: DEV (Device component use); USES (Uses)
(coupling particle; piezoelec./electrostrictive film device with high resonance frequency and high speed response)

IT 7440-06-4, Platinum, uses
RL: DEV (Device component use); USES (Uses)
(electrode; piezoelec./electrostrictive film device with high resonance frequency and high speed response)

IT 12030-85-2, Potassium niobium oxide (KNbO₃) 12233-00-0, Bismuth sodium titanium oxide (Bi_{0.5}Na_{0.5}TiO₃) 118692-25-4, Lead magnesium niobium titanium zirconium oxide (PbMg_{0.12}Nb_{0.25}Ti_{0.38}Zr_{0.25}O₃) 141051-68-5, Lead magnesium niobium titanium zirconium oxide (PbMg_{0.07}Nb_{0.13}Ti_{0.43}Zr_{0.37}O₃) 444732-87-0, Lead magnesium nickel niobium titanium zirconium oxide (PbMg_{0.05}Ni_{0.01}Nb_{0.13}Ti_{0.43}Zr_{0.37}O₃)
RL: DEV (Device component use); USES (Uses)
(piezoelec. material; piezoelec./electrostrictive film device with high resonance frequency and high speed response)

IT 64417-98-7, Yttrium zirconium oxide
RL: DEV (Device component use); USES (Uses)
(substrate; piezoelec./electrostrictive film device with high resonance frequency and high speed response)

IT 1314-23-4, Zirconia, uses
RL: DEV (Device component use); USES (Uses)
(yttria-stabilized; piezoelec./electrostrictive film device with high resonance frequency and high speed response)

L29 ANSWER 10 OF 37 INSPEC (C) 2006 IET on STN

AN 2005:8236161 INSPEC DN A2005-04-0670-007; B2005-02-7230-058

TI Miniature pressure sensor and micromachined actuator structure based on low-temperature-cofired ceramics and piezoelectric material

AU Khanna, P.K.; Hornbostel, B.; Grimme, R.; Schafer, W.; Dorner, J.
(Fraunhofer-Inst. fur Produktionstechnik und Automatisierung, Stuttgart, Germany)

SO Materials Chemistry and Physics (15 Sept. 2004), vol.87, no.1, p. 173-8, 7 refs.
CODEN: MCHPDR, ISSN: 0254-0584
SICI: 0254-0584(20040915)87:1L:173:MPSM;1-Z
Price: 0254-0584/2004/\$30.00
Published by: Elsevier, Netherlands

DT Journal
TC Practical; Experimental
CY Netherlands
LA English

AB A novel method to fabricate pressure sensors using low-temperature co-fired ceramic (LTCC) and polyvinylidene fluoride (PVDF) piezoelectric polymer is presented. The basic structure consists essentially of two low-temperature co-fired ceramic **substrates** with an interlayer of polyvinylidene fluoride sandwiched between them. For the **top** and **bottom electrodes**, a thin conductive film is deposited on both sides of the polyvinylidene fluoride layer, but simultaneously polyvinylidene fluoride layers with pre-deposited electrodes are also utilized. The polyvinylidene fluoride **polymer** is normally polarized and has a remnant polarization; therefore, no further electrical poling is required till further processing is done below 80°C. An adhesive layer is selectively provided on each electrode for the attachment of the low-temperature co-fired ceramic **substrate** on the top and bottom of the interlayer and in realizing the sensor structure. The electrical connections are realized through vias, and these via openings also expose the sensing layer to the external pressure. In a parallel effort, an actuator structure developed using laser micromachining for later coupling with the sensor device has also been briefly described. The initial experiments indicate that the low-temperature co-fired ceramic technology can be used to fabricate actuator structures and when combined with polyvinylidene fluoride **polymer**, it can lead to fabrication of sensors in a simplified manner

CC A0670D Sensing and detecting devices; A0630N Pressure measurement; A0710C Micromechanical devices and systems; A8115 Methods of thin film deposition; A6855 Thin film growth, structure, and epitaxy; A4262A Laser materials processing; A7760 Piezoelectricity and electrostriction; A7730 Dielectric polarization and depolarization effects; B7230 Sensing devices and transducers; B7320V Pressure and vacuum measurement; B8380M Microactuators; B2575F Fabrication of micromechanical devices; B2860A Piezoelectric devices; B4360B Laser materials processing; B0520 Thin film growth and epitaxy; B0540 Ceramics and refractories (engineering materials science)

CT dielectric polarisation; laser beam machining; microactuators; micromachining; piezoceramics; piezoelectric actuators; piezoelectricity; **polymer** films; pressure sensors

ST miniature pressure sensor; micromachined actuator structure; low temperature cofired ceramics substrate; LTCC; polyvinylidene fluoride piezoelectric polymer; polyvinylidene fluoride interlayer; thin conductive film; predeposited electrodes; remnant polarization; adhesive layer; laser micromachining; electrical connections; poling

ET C

L29 ANSWER 11 OF 37 INSPEC (C) 2006 IET on STN

AN 2006:8885297 INSPEC

TI Bismuth titanate thin film for pressure sensor prepared by sol gel method

AU Chong Cheong Wei; Yahaya, M.; Salleh, M.M. (Inst. of Microeng. &

SO Nanoelectron., Univ. Kebangsaan Malaysia, Selangor, Malaysia)
 2004 IEEE International Conference on Semiconductor Electronics (IEEE
 Cat. No.04EX917C), 2004, p. 4 pp. of CD-ROM pp., 10 refs.
 ISBN: 0 7803 8659 0
 Price: 0 7803 8659 0/2004/\$20.00
 Published by: IEEE, Piscataway, NJ, USA
 Conference: 2004 IEEE International Conference on Semiconductor
 Electronics, Kuala Lumpur, Malaysia, 7-9 Dec. 2004
 DT Conference; Conference Article
 TC Practical; Experimental
 CY United States
 LA English
 AB Bismuth titanate, Bi₄Ti₃O₁₂ thin film pressure sensor was fabricated by
 sol gel method. The Bi₄Ti₃O₁₂ thin film was synthesized on
 substrate Si/ SiO₂ / RuO₂ at low temperature to avoid
 short-circuit problem. The film was obtained by depositing multiple
 Bi-Ti-O spin coat layers on substrate, followed by
 heating of each layer at 300 C in air for 15 mins. Ag film was then
 deposited as top electrode. The piezoelectric
 response of the sensor was tested by pneumatic loading method. It was
 found that the sensor was sensitive to the applied pressure and the
 response recovered back when the pressure was removed from the chamber.
 This study showed that the piezoelectric Bi₄Ti₃O₁₂ thin film prepared by
 sol gel method potentially be used as a stable pressure sensor
 CC A0670D Sensing and detecting devices; A8115L Deposition from liquid
 phases (melts and solutions); A0630N Pressure measurement; B7230 Sensing
 devices and transducers; B7320V Pressure and vacuum measurement; B0520J
 Deposition from liquid phases; B2810F Piezoelectric and ferroelectric
 materials
 CT bismuth compounds; piezoelectric thin films; piezoelectric transducers;
 pressure sensors; ruthenium compounds; semiconductor thin films; silicon;
 silicon compounds; silver; sol-gel processing; spin coating;
 thin film devices
 ST thin film pressure sensor; sol gel method; low temperature; short-circuit
 problem; spin coat layer; heating; piezoelectric response; pneumatic
 loading; 300 C; 15 min; Bi₄Ti₃O₁₂; Si-SiO₂-RuO₂; Bi-Ti-O
 CHI Bi₄Ti₃O₁₂ ss, Bi₄ ss, O₁₂ ss, Ti₃ ss, Bi ss, Ti ss, O ss; Si-SiO₂-RuO₂
 int, RuO₂ int, SiO₂ int, O₂ int, Ru int, Si int, O int, RuO₂ bin, SiO₂
 bin, O₂ bin, Ru bin, Si bin, O bin, Si el; Bi-Ti-O int, Bi int, Ti int, O
 int, Bi el, Ti el, O el
 PHP temperature 5.73E+02 K; time 9.0E+02 s
 ET O*Ti; Ti3O12; Ti cp; cp; O cp; O*Ru*Si; O sy 3; sy 3; Ru sy 3; Si sy 3;
 SiO2; Si cp; RuO2; Ru cp; SiO2-RuO2; Ti-O; Ti3O; Bi; O; Ti; O*Si; SiO;
 O*Ru; RuO; Ru; Si; Bi*O*Ti; Bi sy 3; Ti sy 3; Bi4Ti3O12; Bi cp; Bi-Ti-O;
 Ag

L29 ANSWER 12 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
 AN 2003:1005231 HCAPLUS
 ED Entered STN: 25 Dec 2003
 TI Piezoelectric/electrostrictive film device
 IN Takahashi, Nobuo; Bessho, Yuki
 PA Ngk Insulators, Ltd., Japan
 SO U.S. Pat. Appl. Publ.
 CODEN: USXXCO
 DT Patent
 LA English
 IC ICM H01L041-08
 INCL 310324000
 FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	US 2003234595	A1	20031225	US 2003-463163	20030617
	US 7019438	B2	20060328		
	JP 2004274014	A2	20040930	JP 2003-169552	20030613
PRAI	JP 2002-182212	A	20020621		
	US 2002-394386P	P	20020708		
	JP 2002-218857	A	20020726		
	JP 2002-299382	A	20021011		
	JP 2003-5714	A	20030114		
	JP 2003-169552	A	20030613		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 20030234595	ICM	H01L041-08
	INCL	310324000
	IPCI	H01L0041-08 [I,A]
	IPCR	H01L0041-09 [I,A]; H01L0041-09 [I,C*]
	NCL	310/324.000
	ECLA	H01L041/09G
JP 2004274014	IPCI	H01L0041-09 [ICM,7]; H01L0041-083 [ICS,7]; H01L0041-187 [ICS,7]; H01L0041-18 [ICS,7,C*]; H01L0041-22 [ICS,7]
	IPCR	H01L0041-083 [I,A]; H01L0041-083 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-18 [I,C*]; H01L0041-187 [I,A]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]

AB There is provided a piezoelectric/electrostrictive film device having larger resonant frequency while having flexural displacement that is equal to or superior to that of conventional piezoelectric/electrostrictive film device, and being excellent in rapid response. The piezoelectric/electrostrictive film device comprises a substrate comprising ceramics, and a piezoelectric/electrostrictive actuator including a lower electrode, a piezoelectric/electrostrictive layer and an upper electrode that are sequentially layered on the substrate, the piezoelectric/electrostrictive layer covering an upper surface of the lower electrode and a lower surface of the upper electrode and protruding over edges thereof, wherein the protruded portion of the piezoelectric/electrostrictive layer is coupled to the substrate via a coupling member. The present device shows substantially the same flexural displacement, but a larger resonant frequency of 3% or more, when compared with those of a piezoelectric/electrostrictive film device comprising same materials and same configuration as the present device, but without coupling member.

RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE

- (1) Anon; JP 04085976 1992 HCAPLUS
- (2) Anon; JP 05124188 1993 HCAPLUS
- (3) Anon; JP 06260694 1994 HCAPLUS
- (4) Anon; JP 09162452 1997
- (5) Anon; JP 2000210615 2000 HCAPLUS
- (6) Hosono; US 5381171 A 1995
- (7) Shimogawa; US 6584660 B1 2003
- (8) Suzuki; US 5469012 A 1995
- (9) Takeuchi; US 5376857 A 1994 HCAPLUS
- (10) Takeuchi; US 5594292 A 1997 HCAPLUS
- (11) Takeuchi; US 5814920 A 1998 HCAPLUS

L29 ANSWER 13 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2003:628534 HCAPLUS
 DN 139:158497
 ED Entered STN: 15 Aug 2003
 TI Thin-film piezoelectric components, component fabrication, and hard disk-driving thin-film piezoelectric devices
 IN Mikami, Hiromasa; Uchiyama, Hirokazu; Kita, Hiroyuki; Kuwashima, Hideki; Torii, Hideo
 PA Matsushita Electric Industrial Co., Ltd., Japan
 SO Jpn. Kokai Tokkyo Koho, 7 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM H01L041-083
 ICS G11B005-596; G11B021-10; G11B021-21; H01L041-08; H01L041-18; H01L041-22

CC 76-7 (Electric Phenomena)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2003229611	A2	20030815	JP 2002-28272	20020205
PRAI	JP 2002-28272		20020205		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2003229611	ICM	H01L041-083
	ICS	G11B005-596; G11B021-10; G11B021-21; H01L041-08; H01L041-18; H01L041-22
	IPCI	H01L0041-083 [ICM,7]; G11B0005-596 [ICS,7]; G11B0021-10 [ICS,7]; G11B0021-21 [ICS,7]; H01L0041-08 [ICS,7]; H01L0041-18 [ICS,7]; H01L0041-22 [ICS,7]
	IPCR	G11B0005-596 [I,A]; G11B0005-596 [I,C*]; G11B0021-10 [I,A]; G11B0021-10 [I,C*]; G11B0021-21 [I,A]; G11B0021-21 [I,C*]; H01L0041-08 [I,A]; H01L0041-08 [I,C*]; H01L0041-083 [I,A]; H01L0041-083 [I,C*]; H01L0041-18 [I,A]; H01L0041-18 [I,C*]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]

AB The title components comprise (1) a 1st laminate prepared by laminating a 1st electrode metal film, a 1st thin film **piezoelec. layer**, and a 2nd electrode metal film, (2) a 2nd laminate prepared by laminating a 3rd electrode metal film, a 2nd thin film **piezoelec. layer**, and a 4th electrode metal film, (3) an adhesive layer to bind the 1st laminate and the 2nd laminate by the 2nd and 4th electrode metal films, (4) a 1st terminal which is at least partly coated with a **polymer** and is provided for impression of voltage across the 1st and 3rd electrode metal films, and (5) a 2nd terminal which is provided for impression of ground level voltage across the 2nd and 4th electrode metal films. The **substrate** is a Si **substrate** deposited with a MgO film instead of a single-crystal MgO **substrate** to give economical device manufacturing

ST magnesia film deposition silicon **substrate** piezoelec laminate

IT Coating materials

(magnesia thin film on silicon **substrate**; thin-film piezoelec. components and component fabrication on a magnesia-coated silicon **substrate** and hard disk-driving thin-film piezoelec. devices)

IT Adhesion, physical

(of piezoelec. laminates; thin-film piezoelec. components and component fabrication on a magnesia-coated silicon **substrate** and hard disk-driving thin-film piezoelec. devices)

IT Piezoelectric apparatus
(thin film laminates; thin-film piezoelec. components and component fabrication on a **magnesia-coated silicon substrate** and hard disk-driving thin-film piezoelec. devices)

IT Piezoelectric materials
(thin film; thin-film piezoelec. components and component fabrication on a **magnesia-coated silicon substrate** and hard disk-driving thin-film piezoelec. devices)

IT 7440-06-4, Platinum, properties
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(electrodes; thin-film piezoelec. components and component fabrication on a **magnesia-coated silicon substrate** and hard disk-driving thin-film piezoelec. devices)

IT 12626-81-2, Lead titanate zirconate
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(piezoelec. thin film and devices; thin-film piezoelec. components and component fabrication on a **magnesia-coated silicon substrate** and hard disk-driving thin-film piezoelec. devices)

IT 7440-21-3, Silicon, properties
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(semiconductor **substrate**, magnesia film deposition on; thin-film piezoelec. components and component fabrication on a **magnesia-coated silicon substrate** and hard disk-driving thin-film piezoelec. devices)

IT 1309-48-4, Magnesium oxide (MgO), properties
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(thin film deposition on silicon **substrate**; thin-film piezoelec. components and component fabrication on a **magnesia-coated silicon substrate** and hard disk-driving thin-film piezoelec. devices)

L29 ANSWER 14 OF 37 JICST-EPlus COPYRIGHT 2006 JST on STN
AN 1030737450 JICST-EPlus
TI Preparation of Ba(Ti,Zr)O₃ Thick Films on Silicon **Substrate** by Screen Printing
AU FUTAKUCHI T; SAKAI Y
FUJITA N; ADACHI M
CS Toyama Industrial Technol. Center, Toyama, Jpn
Toyama Prefectural Univ., Toyama, Jpn
SO Jpn J Appl Phys Part 1, (2003) vol. 42, no. 9B, pp. 5904-5907. Journal Code: G0520B (Fig. 8, Tbl. 1, Ref. 12)
ISSN: 0021-4922
CY Japan
DT Journal; Article
LA English
STA New
AB BaTi_{0.975}Zr_{0.025}O₃ thick films were prepared by a screen-printing method on Pt **bottom electrodes** using silicon **substrates** in the firing temperature range from 1330.DEG.C. to 1370.DEG.C.. The high-temperature sintering of Pt **bottom electrodes** and Ba(Ti,Zr)O₃ thick films was successfully achieved using silicon **substrates** with a fairly thick oxide layer. The ferroelectric and **piezoelectric** properties of the thick films were examined. The remanent polarization of the thick films increased with increasing firing temperature. A remanent polarization of 13.8 MC/cm² for a Ba(Ti,Zr)O₃ thick film was obtained at a firing temperature of 1370.DEG.C.. The longitudinal piezoelectric constant d₃₃ calculated from a unipolar signal (10 kV/cm, 1 Hz) curve was 610 pC/N for the thick film fired at 1370.DEG.C.. (author abst.)
CC BM05030B; BK14050P (537.226.4; 539.23:54-31)

CT ferroelectrics; barium compound; titanate; zirconate; paste; screen printing(graphic arts); sintering; temperature dependence; film thickness; optical microscopy; platinum electrode; **substrate(plate)**; silicon; thermal diffusion; grain size(crystal); dielectric polarization; hysteresis; **electrostriction**; residual polarization; longitudinal mode; piezoelectricity; interface(surface); surface reaction

BT dielectrics; dielectric material; material; alkaline earth metal compound; oxoate; oxygen compound; oxygen group element compound; titanium compound; 4A group element compound; transition metal compound; zirconium compound; object; printing(graphic arts); beneficiation of ore; heat treatment; treatment; dependence; thickness; length; geometric quantity; microscopy; observation and view; electrode; plate classified by application; plate(material); third row element; element; carbon group element; diffusion; transport phenomenon; phenomenon; particle size(ratio); degree; polarization(phenomenon); polarization; irreversible process; process; electromechanical effect; electrical property; electric field effect; effect; mode; face; heterogeneous reaction; chemical reaction

ST interface reaction

L29 ANSWER 15 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
 AN 2004:1130428 HCAPLUS
 DN 142:421884
 ED Entered STN: 27 Dec 2004
 TI Transversal mode piezoelectric actuator
 IN Yin, Qing Rui; Li, Guorong; Chen, Daren; Huang, Tony; Yao, Xi; Zhu, Wei Guang
 PA Data Storage Institute, Singapore; Nanyang Technological University; Xian Jiaotong University; Shanghai Institute of Ceramics
 SO Singapore Pat. Appl., 20 pp.
 CODEN: SGXXAI
 DT Patent
 LA English
 IC ICM H01L041-083
 ICS H01L041-09
 CC 76-7 (Electric Phenomena)
 Section cross-reference(s): 57

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI SG 91811	A1	20021015	SG 1999-1297	19990313
PRAI SG 1999-1297		19990313		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
SG 91811	ICM	H01L041-083
	ICS	H01L041-09
	IPCI	H01L0041-083 [ICM,7]; H01L0041-09 [ICS,7]
	IPCR	H01L0041-083 [I,A]; H01L0041-083 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]

AB A transversal mode monolithic multilayer piezoelec. actuator (TM-MMPA) and method for making the same are disclosed. The thickness of all of the **piezoelec. layers** are the same, and metal electrodes are prepared on the upper and lower surfaces of the actuator. Elastic insulation layers are formed to cover the metal electrodes. All **piezoelec. layers between the electrodes** become piezoelec. responsive after poling, thus, no hindrance occurs to transversal displacement, whereas a large force to hinder the transversal movement is present in existing longitudinal mode actuators due to the non-piezoelec. responsive top and bottom layers. The present TM-MMPA is suitable for practical use where a single transversal

mode piezoelec. bar is generally used, and can also be used where low driving voltages are required, where the single bar piezoelec. actuator can not.

ST transversal mode monolithic multilayer piezoelec actuator

IT Electric contacts

Electrostriction

Piezoelectric materials

(in transversal mode monolithic multilayer piezoelec. actuatortransversal mode monolithic multilayer piezoelec. actuator)

IT Multilayers

(transversal mode monolithic multilayer piezoelec. actuator)

IT Coating materials

Electric insulators

(transversal mode monolithic multilayer piezoelec. actuator comprising)

IT Metals, uses

RL: NUU (Other use, unclassified); USES (Uses)

(transversal mode monolithic multilayer piezoelec. actuator comprising metal electrodes)

IT Ceramics

(transversal mode monolithic multilayer piezoelec. actuator comprising protective coatings from)

IT Piezoelectric actuators

(transversal mode piezoelec. actuator)

IT Electrically conductive pastes

(use in transversal mode monolithic multilayer piezoelec.

actuatortransversal mode monolithic multilayer piezoelec. actuator)

IT 850214-03-8 850214-04-9, Barium lead lithium niobium sodium oxide

(Ba_{2.6}-3.25Pb_{1.4}-1.75Li_{0.12}-0.24Nb₁₀Na_{0.88}-1.76O₃₀)

RL: NUU (Other use, unclassified); USES (Uses)

(transversal mode monolithic multilayer piezoelec. actuator comprising)

IT 12735-99-8 12772-01-9

RL: DEV (Device component use); USES (Uses)

(transversal mode monolithic multilayer piezoelec. actuator comprising metal electrodes)

IT 7440-22-4, Silver, uses

RL: DEV (Device component use); USES (Uses)

(transversal mode monolithic multilayer piezoelec. actuatortransversal mode monolithic multilayer piezoelec. actuator comprising metal electrodes)

L29 ANSWER 16 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2003:258871 HCAPLUS

DN 138:247076

ED Entered STN: 04 Apr 2003

TI Laminated multilayer thick-film actuator

IN Zhu, Wei Guang; Yao, Kui; Chang, Kuan Teck; Yao, Xi; Yin, Qing Rui

PA Data Storage Institute, Singapore; Nanyang Technological University; Xian Jiaotong University; Shanghai Institute of Ceramics

SO Singapore Pat. Appl., 25 pp.

CODEN: SGXXAI

DT Patent

LA English

IC ICM H01L041-24

ICS C04B035-64

CC 76-7 (Electric Phenomena)

Section cross-reference(s): 57

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	SG 88736	A1	20020521	SG 1997-3488	19971107

PRAI SG 1997-3488

19971107

CLASS

PATENT NO. CLASS PATENT FAMILY CLASSIFICATION CODES

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
SG 88736	ICM	H01L041-24
	ICS	C04B035-64
	IPCI	H01L0041-24 [ICM,7]; C04B0035-64 [ICS,7]
	IPCR	C04B0035-64 [I,A]; C04B0035-64 [I,C*]; H01L0041-24 [I,A]; H01L0041-24 [I,C*]

AB A process for producing a multilayer actuator comprising the steps of: (a) forming alternate piezoelec. or electrostrictive ceramic layers and electrode layers on a substrate to form a laminate body comprising a plurality of piezoelec. or electrostrictive ceramic layers and a plurality of electrode layers, each electrode layer being interposed between 2 ceramic layers; (b) applying isostatic pressure to the laminate body; and (c) firing the laminate body.

ST ceramic laminated multilayer film electrode piezoelec actuator

IT Ceramic coatings
(in laminated thick-film piezoelec. actuator)

IT Piezoelectric actuators
(laminated multilayer thick-film)

IT Electrodes
(laminated multilayer thick-film piezoelec. actuator containing palladium-silver)

IT Multilayers
(laminated thick-film piezoelec. actuator)

IT Laminated materials
(multilayer thick-film piezoelec. actuator)

IT 1317-36-8, Lead monoxide, uses 12626-81-2, Lead titanate zirconate (PbTiO₃-1ZrO₃)

RL: DEV (Device component use); USES (Uses)

(laminated multilayer thick-film piezoelec. actuator containing)

IT 12735-99-8

RL: DEV (Device component use); USES (Uses)

(laminated multilayer thick-film piezoelec. actuator containing electrodes of)

L29 ANSWER 17 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2002:774112 HCAPLUS

DN 137:319154

ED Entered STN: 11 Oct 2002

TI Piezoelectric components and ultrasound oscillation devices

IN Harada, Koichi; Hosono, Yasuharu; Kobayashi, Takeshi; Itsumi, Kazuhiro; Izumi, Mamoru; Yamashita, Yohachi

PA Toshiba Corp., Japan

SO Jpn. Kokai Tokkyo Koho, 8 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01L041-09

ICS H01L041-187; H04R017-00

CC 76-7 (Electric Phenomena)

Section cross-reference(s): 57

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 2002299712	A2	20021011	JP 2001-94155	20010328
PRAI JP 2001-94155		20010328		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2002299712	ICM	H01L041-09
	ICS	H01L041-187; H04R017-00
	IPCI	H01L0041-09 [ICM,7]; H01L0041-187 [ICS,7]; H01L0041-18 [ICS,7,C*]; H04R0017-00 [ICS,7]
	IPCR	H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-18 [I,C*]; H01L0041-187 [I,A]; H04R0017-00 [I,A]; H04R0017-00 [I,C*]
AB		The components comprise a single crystal $Pb(A,Nb)_{1-x}Ti_xO_3$ layer ($A = Zn, Mg, Sc, In; x = 0-0.55$) bound between electrodes . The electrodes formed on the title piezoelec. components contain 5.05-30.0 weight% Pb and/or Zn glass. The glass composition in the electrodes provides sufficient stress strength in prevention of break-down in dicing to give the piezoelec. components.
ST		glass compn electrode piezoelec component dicing stress
IT		Epoxy resins, properties RL: DEV (Device component use); PRP (Properties); TEM (Technical or engineered material use); USES (Uses) (acoustic matching layer ; piezoelec. components and ultrasound oscillation devices)
IT		Stress, mechanical (dicing; piezoelec. components and ultrasound oscillation devices)
IT		Synthetic rubber, properties RL: DEV (Device component use); PRP (Properties); USES (Uses) (ferrite, substrates ; piezoelec. components and ultrasound oscillation devices)
IT		Electrodes (glass content in; piezoelec. components and ultrasound oscillation devices)
IT		Glass, properties RL: MOA (Modifier or additive use); PRP (Properties); TEM (Technical or engineered material use); USES (Uses) (lead bismuth zinc borosilicate, in electrodes; piezoelec. components and ultrasound oscillation devices)
IT		Sound and Ultrasound (oscillators; piezoelec. components and ultrasound oscillation devices)
IT		Piezoelectric materials Piezoelectric transducers (piezoelec. components and ultrasound oscillation devices)
IT		Resonators (piezoelec., ultrasound; piezoelec. components and ultrasound oscillation devices)
IT		7439-92-1, Lead, uses 7440-66-6, Zinc, uses 7440-69-9, Bismuth, uses RL: MOA (Modifier or additive use); USES (Uses) (additive in glass; piezoelec. components and ultrasound oscillation devices)
IT		7440-22-4, Silver, properties RL: DEV (Device component use); MOA (Modifier or additive use); PRP (Properties); USES (Uses) (glass-containing paste, for electrodes; piezoelec. components and ultrasound oscillation devices)
IT		151562-24-2, Lead magnesium niobium titanium oxide ($PbMg_{0.23}Nb_{0.45}Ti_{0.32}O_3$) 151862-30-5, Lead niobium titanium zinc oxide ($PbNb_{0.61}Ti_{0.09}Zn_{0.30}O_3$) 153039-90-8, Lead niobium scandium titanium oxide ($PbNb_{0.29}Sc_{0.29}Ti_{0.42}O_3$) 407635-93-2, Indium lead niobium titanium oxide ($In_{0.32}PbNb_{0.32}Ti_{0.36}O_3$) RL: DEV (Device component use); PRP (Properties); TEM (Technical or engineered material use); USES (Uses) (piezoelec.; piezoelec. components and ultrasound oscillation devices)

L29 ANSWER 18 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
 AN 2002:388777 HCAPLUS
 DN 136:378557
 ED Entered STN: 24 May 2002
 TI Piezoelectric thin-film components and fabrication of components thereof
 IN Yamada, Akira; Maeda, Chisako; Miyashita, Shoji
 PA Mitsubishi Electric Corp., Japan
 SO Jpn. Kokai Tokkyo Koho, 8 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM H01L041-09
 ICS H01L041-18; H01L041-187; H01L041-22; H03H003-02; H03H009-17
 CC 76-7 (Electric Phenomena)
 Section cross-reference(s): 57
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2002151754	A2	20020524	JP 2000-348009	20001115
PRAI	JP 2000-348009		20001115		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2002151754	ICM	H01L041-09
	ICS	H01L041-18; H01L041-187; H01L041-22; H03H003-02; H03H009-17
	IPCI	H01L0041-09 [ICM,7]; H01L0041-18 [ICS,7]; H01L0041-187 [ICS,7]; H01L0041-22 [ICS,7]; H03H0003-02 [ICS,7]; H03H0003-00 [ICS,7,C*]; H03H0009-17 [ICS,7]; H03H0009-00 [ICS,7,C*]
	IPCR	H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-18 [I,A]; H01L0041-18 [I,C*]; H01L0041-187 [I,A]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]; H03H0003-00 [I,C*]; H03H0003-02 [I,A]; H03H0009-00 [I,C*]; H03H0009-17 [I,A]

AB The title components comprise a 1st **piezoelec. layer**, a 2nd **piezoelec. or dielec. layer**, and electrodes. The fabrication involves **coating the 2nd piezoelec. or dielec. layer on the 1st piezoelec. layer** followed by heat-treating to give a 2nd **piezoelec. or dielec. interlayer** between the 1st **piezoelec. layer** and the **upper electrode**. The fabrication prevents elastic wave scattering, elec. loss, and characteristic deterioration.

ST **piezoelec dielec interlayer thin film device elastic wave scattering**

IT Wave
 (elastic, scattering prevention; piezoelec. thin-film components and fabrication of components thereof)

IT Piezoelectric materials
 Piezoelectric transducers
 (piezoelec. thin-film components and fabrication of components thereof)

IT Coating materials
 (piezoelec./dielec. interlayer; piezoelec. thin-film components and fabrication of components thereof)

IT Dielectric loss
 (prevention of; piezoelec. thin-film components and fabrication of components thereof)

IT Electric insulators
 (sintered interlayer; piezoelec. thin-film

components and fabrication of components thereof}

IT 12033-89-5, Silicon nitride, processes
 RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
 (dielec. film; piezoelec. thin-film components and fabrication of components thereof)

IT 7440-06-4, Platinum, processes 7440-32-6, Titanium, processes
 RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
 (electrode; piezoelec. thin-film components and fabrication of components thereof)

IT 1314-13-2, Zinc oxide, properties 11115-71-2, Bismuth titanate
 12030-85-2, Niobium potassium oxide (NbKO3) 12031-63-9, Lithium niobate
 12031-66-2, Lithium tantalate 12047-27-7, Barium titanate, properties
 12060-00-3, Lead titanate 12626-81-2, Lead titanate zirconate
 24304-00-5, Aluminum nitride
 RL: DEV (Device component use); PRP (Properties); USES (Uses)
 (piezoelec. interlayer; piezoelec. thin-film components and fabrication of components thereof)

IT 7440-21-3, Silicon, uses
 RL: DEV (Device component use); USES (Uses)
 (single crystalline substrate; piezoelec. thin-film components and fabrication of components thereof)

L29 ANSWER 19 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
 AN 2002:183897 HCAPLUS
 DN 136:240195
 ED Entered STN: 15 Mar 2002
 TI Completely bonded piezoelectric/electrostrictive sensors and actuators
 IN Yamaguchi, Hirofumi; Takahashi, Nobuo
 PA NGK Insulators, Ltd., Japan
 SO Eur. Pat. Appl., 9 pp.
 CODEN: EPXXDW
 DT Patent
 LA English
 IC ICM H01L041-08
 ICS H01L041-187
 CC 76-7 (Electric Phenomena)
 Section cross-reference(s): 57

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1187234	A2	20020313	EP 2001-307651	20010910
EP 1187234	A3	20040901		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
JP 2002094135	A2	20020329	JP 2000-275137	20000911
JP 3465675	B2	20031110		
US 2002070639	A1	20020613	US 2001-948077	20010906
US 6495945	B2	20021217		
PRAI JP 2000-275137	A	20000911		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
EP 1187234	ICM	H01L041-08
	ICS	H01L041-187
	IPCI	H01L0041-08 [ICM,6]; H01L0041-187 [ICS,6]; H01L0041-18 [ICS,6,C*]
	IPCR	H01L0041-09 [I,A]; H01L0041-09 [I,C*]

ECLA: H01L041/09G
 JP 2002094135 IPCI H01L0041-09 [ICM,7]; G01P0015-09 [ICS,7]; H01L0041-187 [ICS,7]; H01L0041-18 [ICS,7,C*]; H02N0002-00 [ICS,7]
 IPCR H01L0041-09 [I,A]; H01L0041-09 [I,C*]
 US 2002070639 IPCI H01L0041-04 [ICM,7]; H01L0041-00 [ICM,7,C*]
 IPCR H01L0041-09 [I,A]; H01L0041-09 [I,C*]
 NCL 310/330.000
 ECLA H01L041/09G

AB The piezoelec./electrostrictive apparatus consists of completely bonded laminated layers. A ceramic substrate comprises a thin diaphragm portion and a thick portion. A lower electrode is formed on the ceramic substrate and is spaced apart from an auxiliary electrode, also formed on the ceramic substrate. A bonding layer comprises an insulator and is formed on the ceramic substrate between the lower and auxiliary electrodes. A piezoelec./electrostrictive layer is formed on at least a portion of each of the lower electrode, the auxiliary electrode and the bonding layer. An upper electrode extends over the piezoelec./electrostrictive layer and contacts the auxiliary electrode. A bonded portion exist wherein the bonding layer serves to completely bond together the substrate and the piezoelec./electrostrictive film layer.

ST lamination joining piezoelec electrostrictive ceramic sensor actuator

IT Electrostriction
 (apparatus; completely bonded piezoelec./electrostrictive sensors and actuators)

IT Electrodes
 (auxiliary; completely bonded piezoelec./electrostrictive sensors and actuators)

IT Dielectric films
 Electrodes
 Joining
 Lamination
 Membranes, nonbiological
 Piezoelectric actuators
 Piezoelectric sensors
 (completely bonded piezoelec./electrostrictive sensors and actuators)

IT Glass, processes
 RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
 (completely bonded piezoelec./electrostrictive sensors and actuators)

IT Ceramics
 (substrates; completely bonded piezoelec./electrostrictive sensors and actuators)

IT 12057-57-7, Lead magnesium niobium oxide (PbMg0.33Nb0.67O3) 12060-00-3, Lead titanium oxide (PbTiO3) 12060-01-4, Lead zirconium oxide (PbZrO3) 12233-00-0, Bismuth sodium titanium oxide (Bi0.5Na0.5TiO3) 152633-92-6, Lead nickel niobium oxide (PbNi0.33Nb0.67O3) 402937-13-7 402937-14-8
 RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
 (completely bonded piezoelec./electrostrictive sensors and actuators)

L29 ANSWER 20 OF 37 INSPEC (C) 2006 IET on STN
 AN 2003:7735560 INSPEC DN A2003-21-6855-029; B2003-10-0520B-024

TI Synthesis of c-axis oriented AlN thin films on metal layers: Al, Mo, Ti, TiN and Ni

AU Iriarte, G.F.; Bjurstrom, J.; Westlinder, J.; Engelmarm, F.; Katardjiev, I.V. (Angstrom Lab., Uppsala Univ., Sweden)

SO 2002 IEEE Ultrasonics Symposium. Proceedings (Cat. No.02CH37388), vol.1, 2002, p. 311-15 vol.1 of 2 vol.1996 pp., 7 refs., Also available on CD-ROM in PDF format

Editor(s): Yuhas, D.E.; Schneider, S.C.

ISBN: 0 7803 7582 3

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Conference: Proceedings of 2002 IEEE International Ultrasonics Symposium, Munich, Germany, 8-11 Oct. 2002

Sponsor(s): Ultrasonics; Ferroelectr., & Frequency Control Soc

DT Conference; Conference Article

TC Application; Experimental

CY United States

LA English

AB Thin piezoelectric polycrystalline films such as AlN, ZnO, etc are of great interest for the fabrication of Thin Film Bulk/Surface Acoustic Resonators (TFBAR) or (TFSAR). It is well known that the degree of c-axis orientation of the thin films correlates directly with the electro-mechanical coupling. The texture of the piezoelectric films in turn is influenced by the structure of the **substrate** material. Thin AlN films, prepared in a magnetron sputtering system, have been deposited onto thin Al, Mo, Ni, Ti and TiN films. Such thin metal layers are used to form the **bottom electrode** of TFBAR as well as to define a short-circuiting plane in TFSAR devices. In both cases, they serve as a **substrate** for the growth of the piezoelectric film. It has been found that the texture of the bottom metal layer affects significantly the texture of the AlN films, and hence its electroacoustic properties. For this reason, the surface morphology and texture of the metal layers and their influence on the growth of AlN on them has been systematically studied. Thus, the texture and the electro-acoustic properties of the AlN films have been studied as a function of the texture and morphology of the underlying metal films. Subsequently, the deposition processes have been individually optimised with respect to obtaining high electromechanical coupling for all thin film combinations

CC A6855 Thin film growth, structure, and epitaxy; A7755 Dielectric thin films; A7760 Piezoelectricity and electrostriction; A8115C Deposition by sputtering; A6820 Solid surface structure; B0520B Sputter deposition; B2810F Piezoelectric and ferroelectric materials; B2860C Acoustic wave devices; B2520D II-VI and III-V semiconductors

CT aluminium; aluminium compounds; III-V semiconductors; molybdenum; nickel; piezoelectric semiconductors; piezoelectric thin films; semiconductor growth; semiconductor thin films; sputtered **coatings**; surface acoustic wave resonators; surface morphology; surface texture; surface topography; titanium; titanium compounds; wide band **gap** semiconductors

ST c-axis oriented AlN thin films; metal layers; electro-mechanical coupling; piezoelectric films; substrate material; magnetron sputtering; TFBAR; TFSAR; Thin Film Bulk/Surface Acoustic Resonators; bottom metal layer; texture; electroacoustic properties; morphology; AlN; Al; Mo; Ti; TiN; Ni

CHI AlN int, Al int, N int, AlN bin, Al bin, N bin; Al sur, Al el; Mo sur, Mo el; Ti sur, Ti el; TiN sur, Ti sur, N sur, TiN bin, Ti bin, N bin; Ni sur, Ni el

ET V; Al*N; AlN; Al cp; cp; N cp; N; Al; Mo; Ti; N*Ti; TiN; Ti cp; Ni; O*Zn; ZnO; Zn cp; O cp

L29 ANSWER 21 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
 AN 2001:392128 HCAPLUS
 DN 134:375033
 ED Entered STN: 31 May 2001
 TI Encapsulated thin-film resonator with high Q and improved performance and
 fabrication method using diffusion barrier
 IN Lakin, Kenneth Meade
 PA TFR Technologies, Inc., USA
 SO U.S., 8 pp.
 CODEN: USXXAM
 DT Patent
 LA English
 IC ICM H01L041-04
 INCL 310364000
 CC 76-7 (Electric Phenomena)
 FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 6239536	B1	20010529	US 1998-149319	19980908
PRAI US 1998-149319		19980908		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 6239536	ICM	H01L041-04
	INCL	310364000
	IPCI	H01L0041-04 [ICM,7]; H01L0041-00 [ICM,7,C*]
	IPCR	H03H0003-00 [I,C*]; H03H0003-02 [I,A]; H03H0009-00 [I,C*]; H03H0009-17 [I,A]
	NCL	310/364.000
	ECLA	H03H003/02; H03H009/02B8N; H03H009/17A; H03H009/17A1

AB A thin-film piezoelec. resonator and method of fabrication that includes a barrier layer of material **between** the underlying **electrode** and a **layer of piezoelec. material**.
 For example, in a resonator that uses Zn oxide for the **layer of piezoelec. material**, a barrier **layer** of Al nitride is deposited upon an underlying Al electrode to protect the Al electrode from oxidation or structural deformation during the subsequent deposition of the **piezoelec. layer** of Zn oxide. The barrier layer of Al nitride is deposited in a manner so as to provide a **substrate** having a substantial degree of uniformity of crystal orientation upon which the **layer of piezoelec. material** may then be deposited in a manner such that the **piezoelec. layer** will, itself, also have a substantial degree of uniformity in the orientations of its crystals. The resonator includes a 2nd **electrode** deposited upon the **upper surface** of the piezoelec. material or upon the upper surface of a 2nd barrier layer of Al nitride that is deposited upon the upper surface of the **piezoelec . layer**.

ST piezoelec resonator diffusion barrier fabrication
 IT Coating process
 Diffusion barrier
 Electric contacts
 Electronic device fabrication
 Piezoelectric materials
 Potting
 Resonators
 (encapsulated thin-film resonator with high Q and improved performance and fabrication method using diffusion barrier)
 IT Resonators

(piezoelec.; encapsulated thin-film resonator with high Q and improved performance and fabrication method using diffusion barrier)
 IT 1314-13-2, Zinc oxide, processes 7429-90-5, Aluminum, processes 24304-00-5, Aluminum nitride
 RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
 (encapsulated thin-film resonator with high Q and improved performance and fabrication method using diffusion barrier)

RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Anon; CRC Handbook of Chemistry and Physics, College Edition 50th Edition PB-153
- (2) Ceramic Industry; 1997, V147(1), P151
- (3) Lakin; IEEE MTT-S Digest 1993, P1517
- (4) Mikoshiba; US 4511816 1985
- (5) Pradal; US 5760663 1998
- (6) Sze, S; Physics of Semiconductor Devices, 2nd Ed P852
- (7) Utumi; US 5571603 1996 HCAPLUS

L29 ANSWER 22 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2001:778388 HCAPLUS

DN 135:338047

ED Entered STN: 26 Oct 2001

TI Manufacture of piezoelectric components and ink jet recording heads

IN Kamei, Hiroyuki

PA Seiko Epson Corp., Japan

SO Jpn. Kokai Tokkyo Koho, 9 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01L041-22

ICS B41J002-16; B41J002-045; B41J002-055; C04B035-49; H01L041-09;

H01L041-18

CC 76-7 (Electric Phenomena)

Section cross-reference(s): 57

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 2001298222	A2	20011026	JP 2000-114307	20000414
PRAI JP 2000-114307		20000414		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2001298222	ICM	H01L041-22
	ICS	B41J002-16; B41J002-045; B41J002-055; C04B035-49; H01L041-09; H01L041-18
	IPCI	H01L0041-22 [ICM,7]; B41J0002-16 [ICS,7]; B41J0002-045 [ICS,7]; B41J0002-055 [ICS,7]; C04B0035-49 [ICS,7]; H01L0041-09 [ICS,7]; H01L0041-18 [ICS,7]
	IPCR	B41J0002-045 [I,A]; B41J0002-045 [I,C*]; B41J0002-055 [I,A]; B41J0002-055 [I,C*]; B41J0002-16 [I,A]; B41J0002-16 [I,C*]; C04B0035-49 [I,A]; C04B0035-49 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-18 [I,A]; H01L0041-18 [I,C*]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]

AB The title manufacturing involves forming a lower electrode on a substrate, coating organometallic sol on the lower electrode, gelating the sol, crystallizing the gelated organometallic gel layer to give a piezoelec. film on the lower electrode, and forming an upper

electrode on the piezoelec. film, wherein process for gelating the sol involves drying the coated sol layer and degreasing the dried sol by heating , wherein the drying process involves placing the substrate tightly on a hot plate. The process provides the manufacturing evenly formed piezoelec. coated gel crystallization

ST hot plate heating piezoelec organometallic sol gellation drying crystn

IT Degreasing

Drying
(by heating; manufacture of piezoelec. components and ink jet recording heads)

IT Heating
(by hot plate; manufacture of piezoelec. components and ink jet recording heads)

IT Magnetic recording heads
(ink jet; manufacture of piezoelec. components and ink jet recording heads)

IT Piezoelectric materials
(manufacture of piezoelec. components and ink jet recording heads)

IT Crystallization
(of organometallic sol; manufacture of piezoelec. components and ink jet recording heads)

IT Gelation
(of sol layer; manufacture of piezoelec. components and ink jet recording heads)

IT Coating materials
(organometallic sol; manufacture of piezoelec. components and ink jet recording heads)

IT 7440-06-4, Platinum, properties
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(electrode; manufacture of piezoelec. components and ink jet recording heads)

IT 106699-87-0P, Lead titanium zirconium oxide (PbTi_{0.44}Zr_{0.56}O₃)
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PNU (Preparation, unclassified); PRP (Properties); PREP (Preparation); PROC (Process); USES (Uses)
(piezoelec. film, formation by crystallization of sol and gel; manufacture of piezoelec. components and ink jet recording heads)

IT 7440-21-3, Silicon, uses
RL: DEV (Device component use); USES (Uses)
(substrate; manufacture of piezoelec. components and ink jet recording heads)

L29 ANSWER 23 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2001:770964 HCAPLUS

ED Entered STN: 24 Oct 2001

TI Piezoelectric/electrostrictive film type elements and process for producing the same

IN Takeuchi, Yukihiisa; Nanataki, Yukihiisa; Kimura, Koji; Takahasi, Masao

PA Ngk Insulators, Ltd., Japan

SO Eur. Pat. Appl.

CODEN: EPXXDW

DT Patent

LA English

IC ICM H01L041-09

ICS H01L041-24

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1148561	A2	20011024	EP 2001-303594	20010419
	EP 1148561	A3	20040616		

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
IE, SI, LT, LV, FI, RO

JP 2002009359	A2	20020111	JP 2001-119303	20010418
US 2002014816	A1	20020207	US 2001-837546	20010418
US 6518690	B2	20030211		
US 2003033700	A1	20030220	US 2002-236754	20020906
US 6703257	B2	20040309		
PRAI JP 2000-118030	A	20000419		
US 2001-837546	A3	20010418		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
EP 1148561	ICM	H01L041-09
	ICS	H01L041-24
	IPCI	H01L0041-09 [ICM,6]; H01L0041-24 [ICS,6]
	IPCR	H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-24 [I,A]; H01L0041-24 [I,C*]
	ECLA	H01L041/09G; H01L041/24
JP 2002009359	IPCI	H01L0041-09 [ICM,7]; G01L0001-16 [ICS,7]; H01L0041-187 [ICS,7]; H01L0041-18 [ICS,7,C*]; H01L0041-22 [ICS,7]
	IPCR	G01L0001-16 [I,A]; G01L0001-16 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-18 [I,C*]; H01L0041-187 [I,A]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]
US 2002014816	IPCI	H01L0041-04 [ICM,7]; H01L0041-00 [ICM,7,C*]
	IPCR	H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-24 [I,A]; H01L0041-24 [I,C*]
	NCL	310/358.000
	ECLA	H01L041/09G; H01L041/24
US 2003033700	IPCI	H04R0017-00 [ICM,7]; H05K0003-02 [ICS,7]
	IPCR	H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-24 [I,A]; H01L0041-24 [I,C*]
	NCL	029/025.350
	ECLA	H01L041/09G; H01L041/24

AB An integrated piezoelec./electrostrictive film type element with excellent durability, includes a substrate made of a ceramic material composed mainly of completely stabilized or partially stabilized zirconium oxide, and a piezoelec./electrostrictive operating section integrated onto the ceramic substrate by a film-forming method, the piezoelec./electrostrictive operating section comprising a lower electrode, a piezoelec./electrostrictive layer of a lead element-containing composition, and an upper electrode, wherein a heterophase-occurrence rate at a surface of the piezoelec./electrostrictive layer is controlled to a range of 0.1 to 30%.

L29 ANSWER 24 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2000:305609 HCAPLUS
DN 132:302074
ED Entered STN: 11 May 2000
TI Acoustic resonators and their manufacture
IN Ruby, Richard C.; Desai, Yogesh; Bradbury, Donald R.
PA Hewlett-Packard Company, USA
SO U.S., 8 pp.
CODEN: USXXAM
DT Patent
LA English
IC ICM H01L041-08
INCL 310363000

CC 76-7 (Electric Phenomena)

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 6060818	A	20000509	US 1998-88964	19980602
PRAI US 1998-88964		19980602		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 6060818	ICM	H01L041-08
	INCL	310363000
	IPCI	H01L0041-08 [ICM,7]
	IPCR	H03H0009-00 [I,C*]; H03H0009-17 [I,A]
	NCL	310/363.000; 029/025.350; 310/349.000
	ECLA	H03H009/17A1A; H03H009/58F2S

AB A resonator includes a layer of piezoelec. material sandwiched between 1st and 2nd electrodes. The 1st electrode includes a conducting sheet having a root-mean-square variation in height of <2 μ m. The resonator bridges a cavity in a substrate on which the resonator is constructed. The resonator is constructed by creating a cavity in the substrate and filling it with a sacrificial material that can be rapidly removed from the cavity after the deposition of the various layers making up the resonator. The surface of the filled cavity is polished to provide a root-mean-square variation in height of <0.5 μ m. The 1st electrode is deposited on the polished surface to a thickness that assures that the root-mean-square variation in height of the metallic layer is <2 μ m. The piezoelec. layer is deposited on the 1st electrode and the 2nd electrode is then deposited on the piezoelec. layer.

The sacrificial material is then removed from the cavity by opening vias into the cavity and removing the material through the vias. The preferred sacrificial material is phosphosilicate glass.

ST acoustic resonator manuf; piezoelec resonator manuf

IT Resonators

(acoustic; manufacture of piezoelec. acoustic resonators)

IT Polishing

(in manufacture of piezoelec. acoustic resonators)

IT Piezoelectric materials

(manufacture of acoustic resonators containing)

IT Resonators

(piezoelec.; manufacture of piezoelec. acoustic resonators)

IT Vinyl compounds, processes

RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(polymers, sacrificial material; in manufacture of piezoelec. acoustic resonators)

IT Borophosphosilicate glasses

Phosphosilicate glasses

RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(sacrificial material; in manufacture of piezoelec. acoustic resonators)

IT Glass, processes

RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(spin on, sacrificial material; in manufacture of piezoelec. acoustic resonators)

IT 7439-98-7, Molybdenum, processes 24304-00-5, Aluminum nitride (AlN)

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(manufacture of acoustic resonators containing)

IT 9003-07-0, Polypropylene 9003-53-6, Polystyrene
 RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
 (sacrificial material; in manufacture of piezoelec. acoustic resonators)

RE.CNT 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Ruby; US 5587620 1996 HCAPLUS

(2) Ruby; US 5873153 1999 HCAPLUS

L29 ANSWER 25 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2000:43229 HCAPLUS

DN 132:101597

ED Entered STN: 18 Jan 2000

TI Piezoelectric actuators

IN Yamanaka, Kunihiro; Akiyama, Zenichi

PA Ricoh Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 6 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM B41J002-045

ICS B41J002-055; B41J002-16; H01L041-09; H01L041-24

CC 76-7 (Electric Phenomena)

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 2000015809	A2	20000118	JP 1998-190266	19980706
PRAI JP 1998-190266		19980706		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2000015809	ICM	B41J002-045
	ICS	B41J002-055; B41J002-16; H01L041-09; H01L041-24
	IPCI	B41J0002-045 [ICM,7]; B41J0002-055 [ICS,7]; B41J0002-16 [ICS,7]; H01L0041-09 [ICS,7]; H01L0041-24 [ICS,7]
	IPCR	B41J0002-045 [I,A]; B41J0002-045 [I,C*]; B41J0002-055 [I,A]; B41J0002-055 [I,C*]; B41J0002-16 [I,A]; B41J0002-16 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-24 [I,A]; H01L0041-24 [I,C*]

AB The actuators comprise Si **substrates**, piezoelec./
electrostriction driving parts, ≥1 intermediate layers
 which contain Ta 1st layers and Ta nitride 2nd layers, Pt-Rh alloy
bottom electrode layers, piezoelec.
layers, and to electrode layers. The actuators are cable of high
 integration, and free of the peeling of electrode layers, and prevent
 deterioration of piezoelec. characteristic.

ST piezoelec actuator silicon tantalum nitride; platinum rhodium electrode
 piezoelec actuator

IT Piezoelectric actuators
 (piezoelec. actuators with Si **substrates** and Ta-based
 intermediate layers)

IT 7440-21-3, Silicon, uses
 RL: DEV (Device component use); USES (Uses)
 (piezoelec. actuators with Si **substrates**)

IT 11107-71-4, Platinum, rhodium
 RL: DEV (Device component use); USES (Uses)
 (piezoelec. actuators with Si **substrates** and **bottom**
electrode layers from)

IT 7440-25-7, Tantalum, uses 12033-62-4, Tantalum nitride
 RL: DEV (Device component use); USES (Uses)

(piezoelec. actuators with Si **substrates** and intermediate layers from)

L29 ANSWER 26 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2005:678132 HCAPLUS

ED Entered STN: 01 Aug 2005

TI Manufacturing method for light modulation device

IN Kim, Jeong Sam

PA Daewoo Electronics Co.,ltd, S. Korea

SO Repub. Korea, No pp. given

CODEN: KRXXFC

DT Patent

LA Korean

IC ICM G02F001-015

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI KR 179621	B1	19990501	KR 1994-34981	19941219
PRAI KR 1994-34981		19941219		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
KR 179621	ICM	G02F001-015
	IPCI	G02F0001-015 [ICM,7]; G02F0001-01 [ICM,7,C*]
	IPCR	G02F0001-01 [I,C*]; G02F0001-015 [I,A]

AB PURPOSE: A method of fabricating an optical path adjustment apparatus is provided to form a sacrificial layer as **polymer** thereby removing the sacrificial layer with a high selectivity to a metal layer or a ceramic material layer. CONSTITUTION: The method of fabricating an optical path adjustment apparatus comprises the steps of: forming a **polymer** layer on the whole area of a matrix **substrate** (10) on which a signal electrode pad(12) provided and exposing the signal electrode pad(12) by partially etching the **polymer** layer; forming a metal layer on the whole area of the **substrate** to form a **lower electrode**(22); forming a **piezoelectric** material layer on the upper side of the metal layer; forming a metal layer on the whole area of the **piezoelectric** material layer to form an **upper electrode**(26); etching the **lower metal layer**(22), the **piezoelectric** material layer, and the upper metal layer(26) to divide elements.

L29 ANSWER 27 OF 37 INSPEC (C) 2006 IET on STN

AN 2000:6703123 INSPEC DN B2000-10-2860C-049

TI The influence of ZnO and electrode thickness on the performance of thin film bulk acoustic wave resonators

AU Osbond, P.; Beck, C.M.; Briërley, C.J.; Cox, M.R.; Marsh, S.P.; Shorrocks, N.M. (Marconi Mater. Technol., Towster, UK)

SO 1999 IEEE Ultrasonics Symposium. Proceedings. International Symposium (Cat. No.99CH37027), vol.2, 1999, p. 911-14 vol.2 of 2 vol. 1760 pp., 1 refs.

Editor(s): Schneider, S.C.; Levy, M.; McAvoy, B.R.

ISBN: 0 7803 5722 1

Price: 0 7803 5722 1/99/\$10.00

Published by: IEEE, Piscataway, NJ, USA

Conference: 1999 IEEE Ultrasonics Symposium. Proceedings. International Symposium, Caesars Tahoe, NV, USA, 17-20 Oct. 1999

Sponsor(s): Ultrasonics, Ferroelectr., & Frequency Control Soc

DT Conference, Conference Article

TC Experimental

CY United States
LA English
AB Thin film bulk acoustic resonator (FEAR) structures have been fabricated by RF magnetron sputtering of **piezoelectric ZnO layers** onto silicon. Deposition at a range of different temperatures has been performed and the films were assessed using XRD, SEM and electrical characterization. A range of ZnO film thicknesses were deposited and a good correlation was obtained between the theoretical and measured resonant frequencies. The effect of **top and bottom electrode** thickness on the performance of the device is also reported, with specific reference to resonant frequency and Q-value. Wafer scale fabrication of devices has been carried out and excellent yields obtained on 76 mm wafers. Devices exhibiting resonant frequencies in excess of 2 GHz are reported and the prospects for manufacturing passband filters based on FBAR resonators are discussed
CC B2860C Acoustic wave devices; B2810F Piezoelectric and ferroelectric materials; B0520B Sputter deposition
CT acoustic resonators; bulk acoustic wave devices; piezoelectric thin films; Q-factor; sputtered **coatings**; zinc compounds
ST electrode thickness; thin film bulk acoustic wave resonator; RF magnetron sputtering; ZnO piezoelectric layer; silicon substrate; XRD; SEM; electrical characteristics; resonant frequency; Q-factor; wafer scale fabrication; passband filter; FBAR resonator; 76 mm; 2 GHz; ZnO
CHI ZnO bin, Zn bin, O bin
PHP size 7.6E-02 m; frequency 2.0E+09 Hz
ET O; Zn; O*Zn; ZnO; Zn cp; cp; O cp

L29 ANSWER 28 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1998:251336 HCAPLUS
DN 128:316169
ED Entered STN: 02 May 1998
TI Resonator having an acoustic mirror
IN Ylilammi, Markku; Partanen, Meeri
PA Nokia Mobile Phones Limited, Finland; Nokia Mobile Phones Inc.
SO PCT Int. Appl., 35 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM H01L041-08
CC 76-7 (Electric Phenomena)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9816957	A1	19980423	WO 1997-US16233	19970912
	W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW				
	RW: GH, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG				
	US 5873154	A	19990223	US 1996-733177	19961017
	EP 1012889	A1	20000628	EP 1997-941067	19970912
	R: DE, FR, GB				
PRAI	US 1996-733177	A	19961017		
	WO 1997-US16233	W	19970912		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
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WO 9816957 ICM H01L041-08
 IPCI H01L0041-08 [ICM,6]
 IPCR H03H0003-00 [I,C*]; H03H0003-02 [I,A]; H03H0009-00
 [I,C*]; H03H0009-17 [I,A]
 ECLA H03H003/02; H03H009/17A1C
 US 5873154 IPCI H01L0041-22 [ICM,6]
 IPCR H03H0003-00 [I,C*]; H03H0003-02 [I,A]; H03H0009-00
 [I,C*]; H03H0009-17 [I,A]
 NCL 029/025.350; 310/324.000; 310/334.000; 427/100.000
 ECLA H03H003/02; H03H009/17A1C
 EP 1012889 IPCI H01L0041-08 [ICM,6]
 IPCR H03H0003-00 [I,C*]; H03H0003-02 [I,A]; H03H0009-00
 [I,C*]; H03H0009-17 [I,A]
 ECLA H03H003/02; H03H009/17A1C

AB A thin-film bulk acoustic wave resonator (FBAR) comprises a top electrode layer, a substrate, an acoustic mirror formed on the substrate, and a piezoelec. layer formed between the top electrode layer and the acoustic mirror. The acoustic mirror is comprised of a plurality of stacked layers. One of the stacked layers forms a bottom electrode layer. At least another of the stacked layers comprises a polymer. The piezoelec. layer produces vibrations in response to a voltage being applied between the top electrode and the bottom electrode. The acoustic mirror acoustically isolates these vibrations from the substrate. The polymer is preferably an electronic grade polymer and has the capability of withstanding the deposition of the piezoelec. layer at an elevated temperature. The layers forming the acoustic mirror which do not comprise the polymer comprise a high-acoustic-impedance material, e.g. W. The polymer can be spun on the substrate during fabrication of the FBAR.

ST film bulk acoustic wave resonator mirror

IT Mirrors

(acoustic; thin-film bulk acoustic wave resonator having)

IT Resonators

(piezoelec.; thin-film bulk acoustic wave resonator having acoustic mirror)

IT Glass substrates

Piezoelectric materials

(thin-film bulk acoustic wave resonator having acoustic mirror containing)

IT Polyimides, uses

Polymers, uses

RL: DEV (Device component use); USES (Uses)

(thin-film bulk acoustic wave resonator having acoustic mirror containing)

IT 1303-00-0, Gallium arsenide, uses 1314-13-2, Zinc oxide (ZnO), uses 7440-21-3, Silicon, uses 7440-33-7, Tungsten, uses 7631-86-9, Silica, uses 24304-00-5, Aluminum nitride (AlN) 124221-30-3, Cyclotene

RL: DEV (Device component use); USES (Uses)

(thin-film bulk acoustic wave resonator having acoustic mirror containing)

RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Bhardwaj; US 5332943 A 1994

(2) Krishnaswamy; US 5185589 A 1993

(3) Sudol; US 5629906 A 1997

L29 ANSWER 29 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 1998:251335 HCAPLUS

DN 128:316168

ED Entered STN: 02 May 1998

TI Fabricating thin-film bulk acoustic wave resonators (FBARs) on glass substrates

IN Ylilammi, Markku; Partanen, Meeri

PA Nokia Mobile Phones Limited, Finland; Nokia Mobile Phones Inc.

SO PCT Int. Appl., 32 pp.

CODEN: PIXXD2

DT Patent

LA English

IC ICM H01L041-08

CC 76-7 (Electric Phenomena)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE	
PI	WO 9816956	A1	19980423	WO 1997-US16231	19970912	
	W:			AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW		
	RW:			GH, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG		
	AU 9742700	A1	19980511	AU 1997-42700	19970912	
	EP 1012888	A1	20000628	EP 1997-941066	19970912	
	R:			DE, FR, GB, IT		
	JP 2002509644	T2	20020326	JP 1998-518344	19970912	
	US 2003102773	A1	20030605	US 2002-278612	20021022	
	US 6839946	B2	20050111			
PRAI	US 1996-734467	A	19961017			
	WO 1997-US16231	W	19970912			

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 9816956	ICM	H01L041-08
	IPCI	H01L0041-08 [ICM,6]
	IPCR	H03H0003-00 [I,C*]; H03H0003-02 [I,A]; H03H0009-00 [I,C*]; H03H0009-17 [I,A]
	ECLA	H03H003/02; H03H009/17A1A
AU 9742700	IPCI	H01L0041-08 [ICM,6]
	IPCR	H03H0003-00 [I,C*]; H03H0003-02 [I,A]; H03H0009-00 [I,C*]; H03H0009-17 [I,A]
	ECLA	H03H003/02; H03H009/17A1A
EP 1012888	IPCI	H01L0041-08 [ICM,6]
	IPCR	H03H0003-00 [I,C*]; H03H0003-02 [I,A]; H03H0009-00 [I,C*]; H03H0009-17 [I,A]
	ECLA	H03H003/02; H03H009/17
JP 2002509644	IPCI	H01L0041-09 [ICM,7]; H01L0041-22 [ICS,7]; H03H0003-02 [ICS,7]; H03H0003-00 [ICS,7,C*]; H03H0009-17 [ICS,7]; H03H0009-00 [ICS,7,C*]
	ECLA	H03H003/02; H03H009/17A1A
US 2003102773	IPCI	H04R0017-00 [ICM,7]; H01L0041-04 [ICS,7]; H01L0041-00 [ICS,7,C*]; H01L0041-08 [ICS,7]; H01L0041-18 [ICS,7]
	IPCR	H03H0003-00 [I,C*]; H03H0003-02 [I,A]; H03H0009-00 [I,C*]; H03H0009-17 [I,A]
	NCL	310/311.000
	ECLA	H03H003/02; H03H009/17; H03H009/17A1A
AB		The method comprises: (A) forming a sacrificial layer comprising a metal or a polymer over a selected portion of a substrate;
		(B) forming a protective layer on the sacrificial layer and on selected portions of the substrate; (C) forming a bottom

electrode layer on a selected portion of the protective layer; (D) forming a piezoelec. layer on a selected portion of the protective layer; (E) forming a top electrode on a selected portion of the piezoelec. layer; and (F) removing the sacrificial layer to form an air gap. The use of a metal or polymer to form sacrificial layers has several advantages over the use of ZnO to form such layers. In accordance with a further aspect of the invention, an FBAR is provided which includes a glass substrate. The use of glass to form substrates offers several advantages over the use of other materials. For example, most types of glass are less expensive than semiconductor materials, and exhibit low permittivity and low parasitic capacitance. Most glass materials are substantially loss free when being used in microwave-frequency applications.

ST film bulk acoustic wave resonator manuf; glass substrate
acoustic wave resonator manuf

IT Glass substrates

(fabricating thin-film bulk acoustic wave resonators (FBARs) on)

IT Coating materials

Piezoelectric materials

(fabricating thin-film bulk acoustic wave resonators (FBARs) on glass
substrates containing)

IT Metals, processes

Polymers, processes

RL: DEV (Device component use); PEP (Physical, engineering or chemical
process); PROC (Process); USES (Uses)

(fabricating thin-film bulk acoustic wave resonators (FBARs) on glass
substrates containing)

IT Etching

(in fabricating thin-film bulk acoustic wave resonators (FBARs) on
glass substrates)

IT Resonators

(piezoelec.; fabricating thin-film bulk acoustic wave resonators
(FBARs) on glass substrates)

IT 1314-13-2, Zinc oxide (ZnO), processes 7440-50-8, Copper, processes
7631-86-9, Silica, processes

RL: DEV (Device component use); PEP (Physical, engineering or chemical
process); PROC (Process); USES (Uses)

(fabricating thin-film bulk acoustic wave resonators (FBARs) on glass
substrates containing)

RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Dydyk; US 5596239 A 1997 HCAPLUS

(2) Mariani; US 5162691 A 1992 HCAPLUS

(3) Suzuki; US 4642508 A 1987

L29 ANSWER 30 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 1998:590614 HCAPLUS

DN 129:237692

ED Entered STN: 17 Sep 1998

TI Process for preparation of ink-jet printer head

IN Shimada, Masato; Hasegawa, Kazumasa

PA Seiko Epson Corp., Japan

SO U.S., 20 pp., Division of U.S. Ser. No. 627,065.

CODEN: USXXAM

DT Patent

LA English

IC ICM H01L041-22

ICS G01D015-20

INCL 029025350

CC 74-6 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5802686	A	19980908	US 1997-859370	19970520
	JP 2004195994	A2	20040715	JP 2004-109355	20040401
	JP 3734176	B2	20060111		
PRAI	JP 1995-77634	A	19950403		
	JP 1996-7217	A	19960119		
	US 1996-627065	A3	19960403		
	JP 1996-81751	A3	19960403		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 5802686	ICM	H01L041-22
	ICS	G01D015-20
	INCL	029025350
	IPCI	H01L0041-22 [ICM,6]; G01D0015-20 [ICS,6]
	IPCR	B41J0002-14 [I,A]; B41J0002-14 [I,C*]; B41J0002-16 [I,A]; B41J0002-16 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]
	NCL	029/025.350; 029/890.100; 216/027.000; 252/062.900PZ; 310/365.000; 347/070.000
	ECLA	B41J002/14D2; B41J002/16D2; H01L041/09G
JP 2004195994	IPCI	B41J0002-045 [I,A]; B41J0002-055 [I,A]; B41J0002-16 [I,A]
	IPCR	B41J0002-045 [I,A]; B41J0002-045 [I,C*]; B41J0002-055 [I,A]; B41J0002-055 [I,C*]; B41J0002-16 [I,A]; B41J0002-16 [I,C*]

AB A printer head for ink-jet recording is disclosed, comprising a single-crystal silicon **substrate** pierced with holes, a zirconium oxide layer which is brought into direct contact with the surface of the silicon **substrate** or a silicon oxide layer on the surface of the silicon **substrate** so as to cover one end of the holes in the silicon **substrate**, a lower **electrode** provided on the zirconium oxide layer, a **piezoelec. layer** provided on the lower **electrode**, and an upper **electrode** provided on the **piezoelec. layer**. A process for the preparation of the above printer head for ink-jet recording is also disclosed. The printer head for ink-jet recording can support a **piezoelec. substance** having a high piezoelectricity, can exhibit a high head drive durability, and can be produced in a high yield.

ST ink jet printer head piezoelec element

IT Piezoelectric transducers
(for ink-jet printer heads)

IT Ink-jet printers
(printing heads; with piezoelec. elements)

IT 12057-57-7, Lead magnesium niobium oxide (PbMg0.33Nb0.67O3) 12060-00-3, Lead titanium oxide (PbTiO3) 12060-01-4, Lead zirconium oxide (PbZrO3)
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(ink-jet printer heads with piezoelec. elements containing)
IT 1314-23-4, Zirconium oxide, uses 7631-86-9, Silica, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(ink-jet printer heads with silicon **substrates** coated with)

IT 7440-21-3, Silicon, uses

RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(ink-jet printer heads with **substrates** of)

RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE

- (1) Akiyama; US 5555219 1996 HCAPLUS
- (2) Anon; EP 0606767 1994 HCAPLUS
- (3) Anon; JP 6297720 1994
- (4) Anon; EP 0636593 1995 HCAPLUS
- (5) Drake; US 4789425 1988
- (6) Hoisington; US 5265315 1993 HCAPLUS
- (7) Inamoto; US 4609427 1986 HCAPLUS
- (8) Sandbach; US 5493320 1996
- (9) Seiko Epson Corp; JP A06297720 1994
- (10) Takeuchi; US 5376875 1994

L29 ANSWER 31 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 1997:399927 HCAPLUS

DN 127:43542

ED Entered STN: 28 Jun 1997

TI Piezoelectric/**electrostriction** film devices for sensing, filtering, and noise eliminating

IN Takeuchi, Yukihisa; Kimura, Koji; Nanataki, Tsutomu

PA NGK Insulators, Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 5 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01L041-08

ICS G01L001-16; H04R017-00

CC 76-7 (Electric Phenomena)

Section cross-reference(s): 57

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 09107132	A2	19970422	JP 1995-265160	19951013
	JP 3432974	B2	20030804		
	US 5889352	A	19990330	US 1996-727083	19961008
PRAI	JP 1995-265160	A	19951013		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 09107132	ICM	H01L041-08
	ICS	G01L001-16; H04R017-00
	IPCI	H01L0041-08 [ICM,6]; G01L0001-16 [ICS,6]; H04R0017-00 [ICS,6]
US 5889352	IPCI	H01L0041-08 [ICM,6]
	IPCR	G01L0009-00 [I,A]; G01L0009-00 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H04R0017-00 [I,A]; H04R0017-00 [I,C*]; H04R0017-04 [N,C*]; H04R0017-08 [N,A]
	NCL	310/330.000; 310/324.000
	ECLA	G01L009/00D10; H01L041/09G; H04R017/00

AB The title components comprise (1) a ceramic **substrate** having a spacer plate having ≥ 1 openings covered and laminated by a covering plate and (2) a piezoelec./**electrostriction** functioning component which is a laminate of a **lower electrode**, the **piezoelec./electrostriction layer**, and an **upper electrode** successively deposited on the outer surface of the covering plate. The components provide sound sensing and

filtering and sound-transmission noise elimination.
 ST piezoelec electrostriction sound noise sensing filtering
 IT Electrostriction
 Piezoelectricity
 Sound detectors
 (composite film; piezoelec./electrostriction film devices)
 IT Noise
 (elimination; piezoelec./electrostriction film devices)
 IT Sound and Ultrasound
 (filtering; piezoelec./electrostriction film devices)
 IT 12626-81-2, Lead titanate zirconate
 RL: PRP (Properties)
 (piezoelec./electrostriction film; piezoelec./
 electrostriction film devices)

L29 ANSWER 32 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
 AN 1997:374336 HCAPLUS
 DN 127:27621
 ED Entered STN: 14 Jun 1997
 TI PbZrO3-PbTiO3 piezoelectric thin film device and its manufacture, and ink
 jet recording head using same device
 IN Sumi, Koji
 PA Seiko Epson Corp., Japan
 SO Jpn. Kokai Tokkyo Koho, 7 pp.
 CODEN: JKXXAF

DT Patent
 LA Japanese
 IC ICM H01L041-09
 ICS B41J002-16; B41J002-045; B41J002-055; C30B029-22; H01L041-187;
 H01L041-24

CC 76-7 (Electric Phenomena)
 Section cross-reference(s): 74

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 09092897	A2	19970404	JP 1995-250863	19950928
PRAI JP 1995-250863		19950928		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 09092897	ICM	H01L041-09
	ICS	B41J002-16; B41J002-045; B41J002-055; C30B029-22; H01L041-187; H01L041-24
	IPCI	H01L0041-09 [ICM,6]; B41J0002-16 [ICS,6]; B41J0002-045 [ICS,6]; B41J0002-055 [ICS,6]; C30B0029-22 [ICS,6]; H01L0041-187 [ICS,6]; H01L0041-24 [ICS,6]
	ECLA	B41J002/14D2

AB In the device comprising a substrate successively coated
 with a primer coating electrode, and a PbZrO3-PbTiO3 piezoelec.
 thin film containing Pb(AxBy)O3 (x, y = mol. ratio; x + y = 1) as an additive;
 concentration of A and/or B is not homogeneous in a depth direction (in a
 direction from the piezoelec. film to the electrode surface), and shows
 maximum at an interface between the piezoelec. film and the electrode. The
 device is manufactured by (1) previously forming a thin film layer of A and/or
 B on the electrode, (2) forming a piezoelec. film, and
 (3) sintering. An ink jet recording head containing an actuator using the
 device is claimed. By forming a A-rich or B-rich perovskite-type oxide
 layer, adhesion of the piezoelec. film to the electrode
 is improved.

ST lead zirconate titanate piezoelec device; actuator lead zirconate titanate

piezoelec device; ink jet recording actuator piezoelec device; printing
ink jet actuator piezoelec device

IT Ink-jet printers
Piezoelectric actuators
(manufacture of PbZrO₃-PbTiO₃ piezoelec. device for ink jet recording head actuators)

IT 7440-02-0, Nickel, uses 7440-03-1, Niobium, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(in manufacture of PbZrO₃-PbTiO₃ piezoelec. device for ink jet recording head actuators)

IT 12057-57-7P, Lead magnesium niobium oxide PbMg_{0.33}Nb_{0.67}O₃ 12060-00-3P,
Lead titanate (pbtio₃) 12060-01-4P, Lead zirconate (pbzro₃)
152633-92-6P, Lead nickel niobium oxide PbNi_{0.33}Nb_{0.67}O₃
RL: DEV (Device component use); PNU (Preparation, unclassified); TEM
(Technical or engineered material use); PREP (Preparation); USES (Uses)
(manufacture of PbZrO₃-PbTiO₃ piezoelec. device for ink jet recording head actuators)

IT 12022-77-4, Iron lead tantalum oxide (FePb₂TaO₆) 12300-05-9, Lead
niobium zinc oxide PbNb_{0.67}Zn_{0.33}O₃ 12339-43-4, Lead antimony niobium
oxide [Pb(Sb_{1/2}Nb_{1/2})O₃] 12439-28-0, Lead yttrium niobium oxide
[Pb(Y_{1/2}Nb_{1/2})O₃] 14568-18-4, Lead cadmium tungsten oxide
[Pb(Cd_{1/2}W_{1/2})O₃] 14784-14-6, Lead cobalt tungsten oxide
[Pb(Co_{1/2}W_{1/2})O₃] 15277-09-5, Lead magnesium tungsten oxide
[Pb(Mg_{1/2}W_{1/2})O₃] 15740-30-4, Lead magnesium tellurium oxide
[Pb(Mg_{1/2}Te_{1/2})O₃] 38683-39-5, Lead nickel tellurium oxide
[Pb(Ni_{1/2}Te_{1/2})O₃] 38683-40-8, Lead manganese tellurium oxide
[Pb(Mn_{1/2}Te_{1/2})O₃] 107827-37-2, Cobalt lead niobium oxide
Co_{0.33}PbNb_{0.67}O₃ 159411-03-7, Lead nickel antimony oxide
[Pb(Ni_{1/3}Sb_{2/3})O₃] 168170-66-9, Lead manganese antimony oxide
[Pb(Mn_{1/3}Sb_{2/3})O₃] 189889-54-1, Cadmium lead niobium oxide
(Cd_{0.33}PbNb_{0.67}O₃) 189889-55-2, Lead iron neodymium oxide
[Pb(Fe_{1/2}Nd_{1/2})O₃] 189889-56-3, Lead chromium neodymium oxide
[Pb(Cr_{1/2}Nd_{1/2})O₃] 879998-12-6, Lead manganese niobium oxide
(Pb₃MnNb₂O₉)
RL: DEV (Device component use); TEM (Technical or engineered material
use); USES (Uses)
(manufacture of PbZrO₃-PbTiO₃ piezoelec. device for ink jet recording head
actuators)

L29 ANSWER 33 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1995:804517 HCAPLUS
DN 123:215833
ED Entered STN: 21 Sep 1995
TI Piezoelectric/**electrostrictive** film element having convex
diaphragm portions and its production
IN Takeuchi, Yukihisa; Nanataki, Tsutomu
PA NGK Insulators, Ltd., Japan
SO Eur. Pat. Appl., 19 pp.
CODEN: EPXXDW
DT Patent
LA English
IC ICM H01L041-09
ICS B41J002-045
CC 76-7 (Electric Phenomena)
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 667647	A1	19950816	EP 1995-300877	19950213
	R: DE, FR, GB, IT, NL				
	JP 08107238	A2	19960423	JP 1994-241172	19941005

JP 3162584	B2	20010508		
US 5600197	A	19970204	US 1994-365129	19941228
JP 08051241	A2	19960220	JP 1995-12327	19950130
JP 3313531	B2	20020812		
US 6049158	A	20000411	US 1995-385926	19950209
EP 667646	A1	19950816	EP 1995-300876	19950213
EP 667646	B1	19981021		
R: DE, FR, GB, IT, NL				
CN 1129359	A	19960821	CN 1995-115543	19950810
CN 1050229	B	20000308		
CN 1127430	A	19960724	CN 1995-115342	19950811
CN 1050008	B	20000301		
US 5774961	A	19980707	US 1996-694280	19960808
US 6108880	A	20000829	US 1998-175405	19981020
PRAI JP 1994-17697	A	19940214		
JP 1994-24174	A	19940222		
JP 1994-122732	A	19940603		
JP 1994-189203	A	19940811		
JP 1994-241172	A	19941005		
US 1994-365129	A3	19941228		
US 1995-385926	A3	19950209		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
EP 667647	ICM	H01L041-09
	ICS	B41J0002-045
	IPCI	H01L0041-09 [ICM,6]; B41J0002-045 [ICS,6]
	IPCR	B41J0002-16 [I,A]; B41J0002-16 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-24 [I,A]; H01L0041-24 [I,C*]; H04R0017-04 [N,C*]; H04R0017-08 [N,A]
JP 08107238	ECLA	B41J002/16D2; H01L041/09G
	IPCI	H01L0041-08 [ICM,6]; H01L0029-84 [ICS,6]; H01L0029-66 [ICS,6,C*]; H01L0041-22 [ICS,6]; H04R0017-00 [ICS,6]
US 5600197	IPCI	H01L0041-08 [ICM,6]
	IPCR	B41J0002-16 [I,A]; B41J0002-16 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-24 [I,A]; H01L0041-24 [I,C*]; H04R0017-04 [N,C*]; H04R0017-08 [N,A]
	NCL	310/328.000; 310/324.000
JP 08051241	ECLA	B41J002/16D2; H01L041/09G; H01L041/24
	IPCI	H01L0041-09 [ICM,6]; H01L0041-22 [ICS,6]; H02N0002-00 [ICS,6]
US 6049158	IPCI	H01L0041-08 [ICM,7]
	IPCR	B41J0002-16 [I,A]; B41J0002-16 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-24 [I,A]; H01L0041-24 [I,C*]; H04R0017-04 [N,C*]; H04R0017-08 [N,A]
	NCL	310/328.000; 310/324.000
	ECLA	B41J002/16D2; H01L041/09G; H01L041/24
EP 667646	IPCI	H01L0041-09 [ICM,6]; H01L0041-24 [ICS,6]
	IPCR	B41J0002-16 [I,A]; B41J0002-16 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-24 [I,A]; H01L0041-24 [I,C*]; H04R0017-04 [N,C*]; H04R0017-08 [N,A]
	ECLA	B41J002/16D2; H01L041/09G; H01L041/24
CN 1129359	IPCI	H01L0041-083 [ICM,6]; H01L0041-22 [ICS,6]
	IPCR	H04R0017-04 [N,C*]; H04R0017-08 [N,A]
CN 1127430	IPCI	H01L0041-09 [ICM,6]; H01L0041-107 [ICS,6]; H01L0041-113 [ICS,6]; H01L0041-24 [ICS,6]

US 5774961 IPCR H04R0017-04 [N,C*]; H04R0017-08 [N,A]
 IPCI H01L0041-22 [ICM,6]
 IPCR B41J0002-16 [I,A]; B41J0002-16 [I,C*]; H01L0041-09
 [I,A]; H01L0041-09 [I,C*]; H01L0041-24 [I,A];
 H01L0041-24 [I,C*]; H04R0017-04 [N,C*]; H04R0017-08
 [N,A]
 NCL 029/025.350; 310/328.000
 ECLA B41J002/16D2; H01L041/09G; H01L041/24
 US 6108880 IPCI H01L0041-22 [ICM,7]
 IPCR B41J0002-16 [I,A]; B41J0002-16 [I,C*]; H01L0041-09
 [I,A]; H01L0041-09 [I,C*]; H01L0041-24 [I,A];
 H01L0041-24 [I,C*]; H04R0017-04 [N,C*]; H04R0017-08
 [N,A]
 NCL 029/025.350; 310/324.000; 310/330.000; 310/358.000
 ECLA B41J002/16D2; H01L041/09G; H01L041/24
 AB A piezoelec./electrostrictive film element includes a ceramic
 substrate having ≥ 1 window and a diaphragm portion for
 closing each window, and a film-like piezoelec./electrostrictive
 unit formed on the diaphragm portion. The diaphragm portion has a convex
 shape and protrudes away from the corresponding window. The piezoelec./
 electrostrictive unit includes a lower electrode
 , a piezoelec./electrostrictive layer, and
 an upper electrode, which are formed on the convex
 outer surface of the diaphragm portion by a film-forming method.
 ST piezoelec electrostrictive film element convex diaphragm
 IT Ceramic materials and wares
 Electrostriction
 Membranes
 (piezoelec./electrostrictive film element having convex
 diaphragm portions and production)
 IT Electric apparatus
 (piezo-, piezoelec./electrostrictive film element having
 convex diaphragm portions and production)
 IT 7440-47-3, Chromium, processes 7440-50-8, Copper, processes
 12060-00-3, Lead titanate 12060-01-4, Lead zirconate 37349-19-2, Lead
 magnesium niobate
 RL: DEV (Device component use); PEP (Physical, engineering or chemical
 process); PROC (Process); USES (Uses)
 (production of piezoelec./electrostrictive film elements containing)
 IT 1314-23-4, Zirconium oxide (ZrO₂), processes
 RL: DEV (Device component use); PEP (Physical, engineering or chemical
 process); PROC (Process); USES (Uses)
 (production of piezoelec./electrostrictive film elements containing
 yttria-stabilized)
 IT 1314-36-9, Yttrium oxide (Y₂O₃), processes
 RL: DEV (Device component use); PEP (Physical, engineering or chemical
 process); PROC (Process); USES (Uses)
 (production of piezoelec./electrostrictive film elements containing
 zirconia stabilized with)
 L29 ANSWER 34 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
 AN 1994:122776 HCAPLUS
 DN 120:122776
 ED Entered STN: 05 Mar 1994
 TI Device having an auxiliary electrode between
 piezoelectric/ electrostrictive layer and
 substrate
 IN Takeuchi, Yukihiisa; Kimura, Koji
 PA NGK Insulators, Ltd., Japan
 SO Eur. Pat. Appl., 12 pp.

CODEN: EPXXDW
 DT Patent
 LA English
 IC ICM H01L041-04
 CC 76-7 (Electric Phenomena)
 Section cross-reference(s): 57

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 561616	A2	19930922	EP 1993-301997	19930316
	EP 561616	A3	19950419		
	EP 561616	B1	19970604		
	R: DE, FR, GB, IT				
	JP 05267742	A2	19931015	JP 1992-91849	19920317
	US 5281888	A	19940125	US 1993-30535	19930312
PRAI	JP 1992-91849	A	19920317		

CLASS

	PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
	EP 561616	ICM	H01L041-04
		IPCI	H01L0041-04 [ICM,5]; H01L0041-00 [ICM,5,C*]
		IPCR	H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]
		ECLA	H01L041/09G; H01L041/22D
	JP 05267742	IPCI	H01L0041-09 [ICM,5]; H01L0041-18 [ICS,5]; H03H0009-24 [ICS,5]; H03H0009-00 [ICS,5,C*]
	US 5281888	IPCI	H01L0041-08 [ICM,5]
		IPCR	H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]
		NCL	310/366.000; 310/358.000; 310/363.000; 310/365.000
AB	<p>A piezoelec./electrostrictive device includes a ceramic substrate formed principally of partially or fully stabilized zirconia; a lower electrode formed on the ceramic substrate; a piezoelec./ electrostrictive layer formed on the lower electrode; and an upper electrode formed on the piezoelec./ electrostrictive layer. The device further includes an auxiliary electrode formed on the ceramic substrate, apart from the lower electrode, such that a portion of the auxiliary electrode is located between the piezoelec./ electrostrictive layer and the ceramic substrate. The auxiliary electrode is formed of an elec. conductive material which permits sufficiently good adhesion to the ceramic substrate and the piezoelec./ electrostrictive layer. The upper electrode extends between and is elec. connected to the piezoelec./electrostrictive layer and the auxiliary electrode.</p>		
ST	piezoelec electrostrictive layer auxiliary electrode device		
IT	Electrostriction		
	(piezoelec. devices having, auxiliary electrode for)		
IT	Electrodes		
	(auxiliary, between piezoelec. and electrostrictive layers)		
IT	12060-00-3, Lead titanate	12060-01-4, Lead zirconate	37349-19-2, Lead magnesium niobate
RL:	TEM (Technical or engineered material use); USES (Uses)		
	(piezoelec./electrostrictive material containing, for devices having auxiliary electrodes)		

IT 1314-23-4, Zirconia, uses
 RL: USES (Uses)
 (substrate, stabilized, for piezoelec./
 electrostrictive device)

IT 1305-78-8, Calcium oxide, uses 1309-48-4, Magnesium oxide, uses
 1314-36-9, Yttrium oxide, uses 11129-18-3, Cerium oxide 12651-43-3,
 Ytterbium oxide
 RL: DEV (Device component use); USES (Uses)
 (zirconia stabilized by, for piezoelec./electrostrictive
 devices)

L29 ANSWER 35 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
 AN 1992:226332 HCAPLUS
 DN 116:226332
 ED Entered STN: 31 May 1992
 TI Laminate piezoelectric actuator element
 IN Takahashi, Yoshikazu; Suzuki, Masahiko; Takeuchi, Makoto
 PA Brother Kogyo K. K., Japan
 SO U.S., 12 pp.
 CODEN: USXXAM
 DT Patent
 LA English
 IC H01L041-08
 INCL 310328000
 CC 76-7 (Electric Phenomena)
 Section cross-reference(s): 57, 74

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5089739	A	19920218	US 1991-669982	19910315
	JP 03270085	A2	19911202	JP 1990-69504	19900319
	JP 04133482	A2	19920507	JP 1990-256083	19900926
	JP 04167580	A2	19920615	JP 1990-294582	19901031
PRAI	JP 1990-69504	A	19900319		
	JP 1990-227635	A	19900828		
	JP 1990-256083	A	19900926		
	JP 1990-294582	A	19901031		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 5089739	IC	H01L041-08
	INCL	310328000
	IPCI	H01L0041-08
	IPCR	B41J0002-27 [I,C*]; B41J0002-295 [I,A]; H01L0041-083 [I,A]; H01L0041-083 [I,C*]
	NCL	310/328.000
JP 03270085	IPCI	H01L0041-09 [ICM,5]
JP 04133482	IPCI	H01L0041-09 [ICM,5]
JP 04167580	IPCI	H01L0041-09 [ICM,5]

AB The element comprises plural laminated piezoelec. subunits, each of which comprises piezoelec. ceramic layers for generating longitudinal electrostrictive strain with a voltage, internal electrodes for applying the voltage to the piezoelec. ceramic layers, and piezoelec. inactive portions which correspond to parts of the piezoelec. ceramic layers having no internal electrodes laminated thereon. The piezoelec. ceramic layers and the internal electrodes are alternatively laminated on each other to form a piezoelec. subunit. An adhesive member having an attaching area equal to or smaller than an area of each internal electrode is provided between the neighboring piezoelec.

subunits to thereby attach and assemble the plural piezoelec. subunits to form the piezoelec. actuator element and form slit portions between the laminated piezoelec. subunits in such a manner as to surround the adhesive member. The piezoelec. actuator element further includes external electrodes provided at both sides thereof in such a manner as to be connected to the internal electrodes to apply the voltage to the internal electrodes. Application of the actuator element for printers is indicated.

ST printer laminate piezoelec actuator

IT Epoxy resins, uses

RL: USES (Uses)

(in laminate piezoelec. actuators)

IT Printing apparatus

(laminate piezoelec. actuators)

IT Electrostriction

(laminate piezoelec. actuators with)

IT Actuators

(piezoelec., laminates)

IT 12626-81-2, Lead titanium zirconium oxide (Pb(Ti,Zr)O₃)

RL: USES (Uses)

(laminate piezoelec. actuator containing)

L29 ANSWER 36 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 1993:549581 HCAPLUS

DN 119:149581

ED Entered STN: 02 Oct 1993

TI Active device and liquid crystal display using same

IN Komatsu, Hiroshi

PA Sanyo Electric Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 4 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM G02F001-1343

ICS G02F001-1333; G02F001-1335; G02F001-136

CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

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PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 04331919	A2	19921119	JP 1991-101327	19910507
PRAI JP 1991-101327		19910507		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 04331919	ICM	G02F001-1343
	ICS	G02F001-1333; G02F001-1335; G02F001-136
	IPCI	G02F0001-1343 [ICM,5]; G02F0001-1333 [ICS,5]; G02F0001-1335 [ICS,5]; G02F0001-136 [ICS,5]; G02F0001-13 [ICS,5,C*]

AB The title device is provided in order on an insulative substrate a polymer layer, a 1st electrode, a ferroelec. layer comprising a vinylidene fluoride-trifluoroethylene copolymer, and a 2nd electrode. The polymer layer such as a PMMA layer formed on the insulative substrate eases the stress caused by the vibration produced by the piezoelectricity of the ferroelec. layer and prevents the peeling between the 1st electrode and ferroelec. layer with the passage of time. The title display has an active substrate having at least the above active device in which the color filter layer comprises the polymer layer. The

construction of the display having the active **substrate** reduces the manufacturing cost of the display.

ST active device stress relaxation **polymer** layer; liq crystal display active device

IT Optical imaging devices
(electrooptical liquid-crystal, containing **polymer** layers for easing stress)

IT 28960-88-5, **Vinylidene** fluoride-trifluoroethylene copolymer

RL: USES (Uses)
(ferroelec. active device having layer of, **polymer** layer for easing stress from)

IT 9011-14-7, PMMA

RL: USES (Uses)
(ferroelec. layer-containing active device having layer of, for easing stress)

L29 ANSWER 37 OF 37 INSPEC (C) 2006 IET on STN

AN 1988:3122902 INSPEC DN A1988-063479

TI The effect of electrode stiffness on the piezoelectric and elastic constants of a piezoelectric bar

AU Moffett, M.B.; (Naval Underwater Syst. Center, New London Lab., CT, USA), Ricketts, D.; Butler, J.L.

SO Journal of the Acoustical Society of America (Feb. 1988), vol.83, no.2, p. 805-11, 29 refs.

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DT Journal

TC Theoretical

CY United States

LA English

AB Electrodes that are stiff and thick compared with the underlying piezoelectric **substrate** material can substantially change the effective piezoelectric and elastic constants from those values that would be obtained in the absence of electrodes. A simple analytical model for the stress distribution inside a composite piezoelectric bar, consisting of **two outer electrode layers** and one inner **piezoelectric layer**, is used to calculate the effective g_{31} , g_{32} , g_{33} , and g_h piezoelectric constants, as well as the effective s_{ij} ($i, j=1, 2, 3$) elastic compliance coefficients. Numerical results for copper-clad, voided poly(**vinylidene fluoride**) (PVDF) sheets are presented

CC A4388 Transduction; devices for the generation and reproduction of sound; A6220D Elasticity, elastic constants; A7760 Piezoelectricity and electrostriction

CT elastic constants; piezoelectricity

ST electrode stiffness; elastic constants; piezoelectric bar; substrate; PVDF

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